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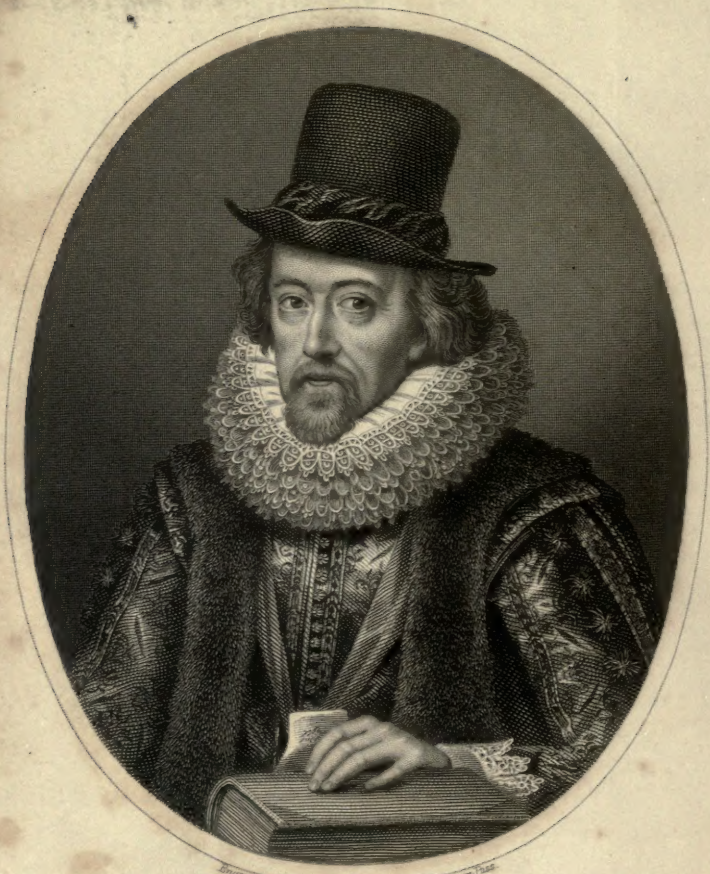

Engraved by Francis Holl, after an old print by Simon Pass

THE RIGHTE HONOURABLE

Sr Frauncis Bacon, knight.

LORDE HIGHE CHANCELLOVR OF ENGLANDE,

and one of his Maties most hon^ble privie Counsell.

London, Longman & Co

THE

WORKS

OF

FRANCIS BACON,

BARON OF VERULAM, VISCOUNT ST. ALBAN,

AND

LORD HIGH CHANCELLOR OF ENGLAND.

COLLECTED AND EDITED BY

JAMES SPEDDING, M.A.

OF TRINITY COLLEGE, CAMBRIDGE;

ROBERT LESLIE ELLIS, M.A.

LATE FELLOW OF TRINITY COLLEGE, CAMBRIDGE;

AND

DOUGLAS DENON HEATH,

BARRISTER-AT-LAW: LATE FELLOW OF TRINITY COLLEGE, CAMBRIDGE.

VOL. I.

LONDON:

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1857.

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HISTORY AND PLAN

OF

THIS EDITION.

BACON'S works were all published separately, and never collected into a body by himself; and though he had determined, not long before his death, to distribute them into consecutive volumes, the order in which they were to succeed each other was confessedly irregular; a volume of moral and political writings being introduced between the first and second parts of the *Instauratio Magna*, quite out of place, merely because he had it ready at the time.[1] In arranging the collected works therefore, every editor must use his own judgment.

Blackbourne, the first editor of an *Opera Omnia*[2], took the *Distributio Operis* as his groundwork, and endeavoured first to place the various unfinished portions of the *Instauratio Magna* in the order in which they would have stood had they been completed according to the original design; and then to marshal the rest in such a sequence that they might seem to hang together, each leading by a natural transition to the next, and so connecting themselves into a kind of whole. But the several pieces were not written with a view to any such connexion, which is altogether forced and fanciful; and the arrangement has this

[1] "Debuerat sequi Novum Organum: interposui tamen Scripta mea Moralia et Politica, quia magis erant in promptu. . . . Atque hic tomus (ut diximus) interjectus est et non ex ordine Instaurationis." — *Ep. ad Fulgentium, Opuscula*, p. 172.

[2] *Francisci Baconi, &c., Opera Omnia, quatuor voluminibus comprehensa.* Londini, MDCCXXX.

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great inconvenience — it mixes up earlier writings with later, discarded fragments with completed works, and pieces printed from loose manuscripts found after the author's death with those which were published or prepared for publication by himself. Birch, the original editor of the quarto edition in four volumes[1] which (reprinted in ten volumes octavo) has since kept the market and is now known as the "trade edition," followed Blackbourne's arrangement in the main, — though with several variations which are for the most part not improvements. The arrangement adopted by Mr. Montagu[2] is-in these respects no better, in all others much worse. M. Bouillet, in his *Œuvres Philosophiques de François Bacon*[3], does not profess to include all even of the Philosophical works; and he too, though the best editor by far who has yet handled Bacon, has aimed at a classification of the works more systematic, as it seems to me, than the case admits, and has thus given to some of the smaller pieces a prominence which does not belong to them.

In the edition of which the first volume is here offered to the public[4], a new arrangement has been attempted; the nature and grounds of which I must now explain.

When a man publishes a book, or writes a letter, or delivers a speech, it is always with a view to some particular audience by whom he means to be understood without the help of a commentator. Giving them credit for such knowledge and capacity as they are presumably furnished with, he himself supplies what else is necessary to make his meaning clear; so that any additional illustrations would be

[1] The Works of Francis Bacon, &c., in five volumes. London, 1763.

[2] The Works of Francis Bacon, Lord Chancellor of England. A new edition by Basil Montagu, Esq. London, 1825–34.

[3] Paris, 1834.

[4] The announcement in Messrs. Longman's monthly list for December was made without my knowledge, or I should have objected to it as apparently implying that a volume would be published every month until the whole work were completed. The fact is that the first three volumes, which include the whole of the Philosophical works, are ready now and will appear at monthly intervals; the 4th and 5th containing the translations, and the 6th and 7th containing the Literary and Professional works, will *I hope* be ready to follow in order. But I cannot make any promise at present as to the time when the remaining portion will be ready.

to that audience more of a hindrance than a help. If however his works live into another generation or travel out of the circle to which they were originally addressed, the conditions are changed. He now addresses a new set of readers, differently prepared, knowing much which the others were ignorant of, ignorant of much which the others knew, and on *both* accounts requiring explanations and elucidations of many things which to the original audience were sufficiently intelligible. These it is the proper business of an editor to supply.

This consideration suggested to me, when consulted about a new edition of Bacon, the expediency of arranging his works with reference—not to subject, size, language, or form—but to the different classes of readers whose requirements he had in view when he composed them. So classified, they will be found to fall naturally into three principal divisions. First, we have his works in philosophy and general literature; addressed to mankind at large, and meant to be intelligible to educated men of all generations. Secondly, we have his works on legal subjects; addressed to lawyers, and presuming in the reader such knowledge as belongs to the profession. Thirdly, we have letters, speeches, charges, tracts, state-papers, and other writings of business; relating to subjects so various as to defy classification, but agreeing in this—they were all addressed to particular persons or bodies, had reference to particular occasions, assumed in the persons addressed a knowledge of the circumstances of the time, and cannot be rightly understood except in relation to those circumstances. In this division every thing will find a place which does not naturally fall into one of the two former; and thus we have the whole body of Bacon's works arranged in three sufficiently distinguishable classes, which may be called for shortness, 1st, The PHILOSOPHICAL and LITERARY; 2nd, The PROFESSIONAL; and 3rd, The OCCASIONAL.

In each of these there is work for an editor to do, but the help he can render differs in the several cases both in

nature and amount, and requires qualifications differing accordingly. To understand and illustrate the Philosophical works in their relation to this age, a man must be not only well read in the history of science both ancient and modern, but himself a man of science, capable of handling scientific questions. To produce a correct text of the Professional works and supply what other help may be necessary for a modern student, a man must be a lawyer. To explain and interpret the Occasional works, and set them forth in a shape convenient for readers of the present generation, a man must have leisure to make himself acquainted by tedious and minute researches among the forgotten records of the time with the circumstances in which they were written. Now as it would not be easy to find any one man in whom these several qualifications meet, it was thought expedient to keep the three divisions separate, assigning each to a separate editor. It was agreed accordingly that the Philosophical works should be undertaken by Mr. Robert Leslie Ellis; the Professional works by Mr. Douglas Denon Heath; the Occasional and the Literary works by me; each division to be made complete in itself, and each editor to be solely responsible for his own part of the work.

Such was our original arrangement. It was concluded in the autumn of 1847; and Mr. Ellis, whose part was to come first, had already advanced so far that he expected to have it ready for the press within another half year, when unhappily about the end of 1849 he was seized with a rheumatic fever, which left him in a condition of body quite incompatible with a labour of that kind. At which time, though the greater portion was in fact done, he did not consider any of it fit to be published as it was; many blanks having been left to be filled up, and some doubtful notes to be corrected, in that general revision which the whole was to have undergone before any part were printed. It was long before he could finally resolve to abandon his task. As soon as he had done so, he handed all his papers over to me, with permission to do with them whatever I thought best. And

hence it is that my name appears in connexion with the Philosophical works; with which otherwise I should not have presumed to meddle.

As soon however as I had arranged and examined his papers, I felt that, however imperfect they might be compared with his own ideal and with what he would himself have made them, they must on no account be touched by anybody else; for that if any other man were allowed to make alterations in them, without notice, according to his own judgment, the reader could have no means of knowing when he was reading the words of Mr. Ellis and when those of his editor, and so their peculiar value would be lost. Perfect or imperfect, it was clear to me that they must be kept as he left them, clear of all alien infusion; and not knowing of any one who was likely to take so much interest or able to spend so much time in the matter as myself, I proposed to take his part into my own hands and edit it; provided only that I might print his notes and prefaces exactly as I found them; explaining the circumstances which had prevented him from completing or revising them, but making no alteration whatever (unless of errors obviously accidental which I might perhaps meet with in verifying any of the numerous references and quotations) without his express sanction. That the text should be carefully printed from the proper authorities, and all the bibliographical information supplied which was necessary to make the edition in that respect complete, — this I thought I might venture to promise. And although I could not undertake to meddle with purely scientific questions, for which I have neither the acquirements nor the faculties requisite, or to bring any stores of learning, ancient or modern, to bear upon the various subjects of inquiry, — although I had no means, I say, of supplying what he had left to be done in those departments, and must therefore be content to leave the work so far imperfect, — yet in all matters which lay within my compass I promised to do my best to complete the illustration and explanation of the text; adding where I had anything

to add, objecting where I had anything to object, but always distinguishing as my own whatever was not his.

To this proposal he agreed, as the best course that could be taken in the circumstances. Early in 1853 I took the work in hand; and in the three volumes which follow, the reader will find the result.

The things then for which in this division I am to be held responsible are —

1st. All notes and prefaces marked with my initials, and all words inserted between brackets, or otherwise distinguished as mine.

2dly. The general distribution of the Philosophical works into three parts, — whereby all those writings which were either published or intended for publication by Bacon himself as parts of the Great Instauration are (for the first time, I believe) exhibited separately, and distinguished as well from the independent and collateral pieces which did not form part of the main scheme, as from those which, though originally designed for it, were afterwards superseded or abandoned.

3dly. The particular arrangement of the several pieces within each part; which is intended to be according to the order in which they were composed; — a point however which is in most cases very difficult to ascertain.

For the grounds on which I have proceeded in each case, and for whatever else in my part of the work requires explanation, I refer to the places. But there are two or three particulars in which this edition differs from former ones, and which may be more conveniently explained here.

In the third and last division of the entire works, according to the scheme already explained, every authentic writing and every intelligibly reported speech of Bacon's (not belonging to either of the other divisions) which can be found in print or in manuscript will be set forth at full length, each in its due chronological place; with an explanatory narrative running between, in which the reader will be supplied to the best of my skill and knowledge with all the information

necessary to the right understanding of them. In doing this, — since the pieces in question are very numerous, and scattered with few and short intervals over the whole of Bacon's life,—I shall have to enter very closely into all the particulars of it; so that this part when finished will in fact contain a complete biography of the man, — a biography the most copious, the most minute, and by the very necessity of the case the fairest, that I can produce; for any material misinterpretation in the commentary will be at once confronted and corrected by the text. The new matter which I shall be able to produce is neither little nor unimportant; but more important than the new matter is the new aspect which (if I may judge of other minds by my own) will be imparted to the old matter by this manner of setting it forth. I have generally found that the history of an obscure transaction becomes clear as soon as the simple facts are set down in the order of their true dates; and most of the difficulties presented by Bacon's life will be found to disappear when these simple records of it are read in their natural sequence and in their true relation to the business of the time. By this means a great deal of controversy which would disturb and encumber the narrative, and help to keep alive the memory of much ignorant and superficial criticism which had better be forgotten, will I hope be avoided. And until this is done I do not think it desirable to attempt a summary biography in the ordinary form. Such a biography may be easily added, if necessary, in a supplemental volume; but I am persuaded that the best which could be written now would be condemned afterwards as altogether unsatisfactory.

It is true however, that a reader, before entering on the study of an author's works, wants to know something about himself and his life. Now there exists a short memoir of Bacon, which was drawn up by Dr. Rawley in 1657 to satisfy this natural desire, and prefixed to the *Resuscitatio*, and is still (next to Bacon's own writings) the most important and authentic evidence concerning him that we possess. The origin of Dr. Rawley's connexion with

Bacon is not known, but it must have begun early. It was in special compliment to Bacon that he was presented on the 18th of January, 1616–17, (being then 28 years old,) to the rectory of Landbeach; a living in the gift of Benet's College, Cambridge.[1] Shortly after, Bacon becoming Lord-Keeper selected him for his chaplain; and during the last five years of his life, which were entirely occupied with literary business, employed him constantly as a kind of literary secretary. Nor did the connexion cease with life; for after Bacon's death Rawley was intrusted by the executors with the care and publication of his papers. Rawley's testimony must therefore be regarded as that of a witness who, however favourable and affectionate, has the best right to be heard, as speaking not from hearsay but from intimate and familiar knowledge during many years and many changes of fortune; and as being moreover the only man among Bacon's personal acquaintances by whom any of the particulars of his life have been recorded. This memoir, which was printed by Blackbourne, with interpolations from Dugdale and Tenison, and placed in front of his edition of 1730, but is not to be found I think in any more modern edition, I have printed entire in its original shape; adding some notes of my own, by help of which it may serve a modern reader for a sufficient biographical introduction.

The Latin translation of it, published by Rawley in 1658 as an introduction to a little volume entitled *Opuscula Philosophica*, and now commonly prefixed to the *De Augmentis Scientiarum*, I have thought it superfluous to reproduce here; this edition being of little use to those who cannot read English, and the translation being of no use to those who can. And this brings me to the second innovation which I have ventured to introduce.

[1] "Ad quam præsentatus fuit per honorand. virum Franciscum Bacon mil. Regiæ maj. advocatum generalem, ejusdem vicariæ [rectoriæ] pro hac unica vice, ratione concessionis magistri et sociorum Coll. C. C. (uti asserebatur) patronus." Collections prefixed to Blackbourne's edition 1730, i. 218. Bacon's father was a member and benefactor of Benet's; which accounts for this compliment.

Bacon had no confidence in the permanent vitality of English as a classical language. "These modern languages," he said, "will at one time or other play the bankrupts with books." Those of his works therefore which he wished to live and which were not originally written in Latin, he translated or caused to be translated into that language — "the universal language," as he called it. This, for his own time, was no doubt a judicious precaution. Appearances however have greatly changed since; and though it is not to be feared that Latin will ever become obsolete, it is certain that English has been rapidly gaining ground upon it, and that of the audience whom Bacon would in these days have especially desired to gather about him, a far greater number would be excluded by the Latin dress than admitted. Considering also the universal disuse of Latin as a medium of oral communication, and the almost universal disuse of it as a medium of communication in writing, even among learned men, and the rapid spreading of English over both hemispheres, it is easy to predict which of the two languages is likely to play the bankrupt first. At any rate the present edition is for the English market. To those who are not masters of English it offers few attractions; while of those who are, not one I suppose in a hundred would care to read a translation even in Baconian Latin, when he had the choice of reading the original in Baconian English. And since the translations in question would increase the bulk of this work by four or five hundred pages and the cost in proportion, it has been thought better to leave them out.

In one respect, it is true, they have a value independent of the English originals. Having been made later and made under Bacon's own eye, the differences, where they are greater than can be naturally accounted for by the different idiom and construction of the languages, must be considered as corrections; besides which, when the meaning of the original is obscure or the reading doubtful, they serve sometimes as a glossary to decide it. This being an advantage which we cannot afford to sacrifice, I have thought

it my duty in all instances to compare the translation carefully with the original, and to quote in foot-notes those passages in which the variation appeared to be material; and as this is a labour which few readers would take upon themselves, I conceive that by the course which I have adopted the English student will be a gainer rather than a loser.

I have also departed from the practice of former editors in not keeping the Latin and English works separate. Such separation is incompatible with the chronological arrangement which I hold to be far preferable. I see no inconvenience in the change which is at all material; and I only mention it here lest any future publisher, out of regard to a superficial symmetry, should go back to the former practice and so destroy the internal coherency of the present plan.

It may be thought perhaps that in arranging the works which were to form parts of the Great Instauration, I ought to have followed the order laid down in the *Distributio Operis*, marshaling them according to their place in the scheme rather than the date of composition; and therefore that the *De Augmentis Scientiarum* which was meant to stand for the first part, should have been placed before the two books of the *Novum Organum*, which were meant for the commencement of the second. But the truth is that not one of the parts of the Great Instauration was completed according to the original design. All were more or less abortive. In every one of them, the *De Augmentis* and the *Novum Organum* itself not excepted, accidental difficulties, and considerations arising out of the circumstances of the time, interfered more or less with the first intention and induced alterations either in form or substance or both. They cannot be made to fit their places in the ideal scheme. It was the actual conditions of Bacon's life that really moulded them into what they are; and therefore the most natural order in which they can be presented is that in which they stand here; first, the *Distributio Operis*, setting forth the perfect work as he had conceived it in his mind, and then the series of

imperfect and irregular efforts which he made to execute it, in the order in which they were made.

The text has been corrected throughout from the original copies, and no verbal alteration (except in case of obvious errors of the press) has been introduced into it without notice. The spelling in the English works has been altered according to modern usage. I have endeavoured however to distinguish those variations which belong merely to the fashion of orthography from those which appear to involve changes in the forms of words. Thus in such words as *president* (the invariable spelling in Bacon's time of the substantive which is now invariably written *precedent*, and valuable as showing that the pronunciation of the word has not changed), *prædjudice*, *fained*, *mathematiques*, *chymist*, &c., I adopt the modern form; but I do not substitute *lose* for *leese*, *politicians* for *politiques*, *external* for *externe*, *Solomon* for *Salomon*, *accommodated* for the past participle *accommodate*; and so on; these being changes in the words themselves and not merely in the manner of writing them. In the spelling of Latin words there are but few differences between ancient and modern usage; but I have thought it better to preserve the original form of all words which in the original are always or almost always spelt in the same way; as *fœlix*, *author*, *chymista*, *chymicus*, *&c.*

In the matter of punctuation and typography, though I have followed the example of all modern editors in altering at discretion, I have not attempted to reduce them entirely to the modern form; which I could not have done without sometimes introducing ambiguities of construction, and sometimes deciding questions of construction which admit of doubt. But I have endeavoured to represent the effect of the original arrangement to a modern eye, with as little departure as possible from modern fashions. I say endeavoured; for I cannot say that I have succeeded in satisfying even myself. But to all matters of this kind I have attended personally; and though I must not suppose that my mind has observed everything that my eyes have looked at,

I am not without hope that the text of this edition will be found better and more faithful than any that has hitherto been produced.

It was part of our original design to append to the Philosophical works an accurate and readable translation of those originally written in Latin; at least of so much of them as would suffice to give an English reader a complete view of the Baconian philosophy. Mr. Ellis made a selection for this purpose. Arrangements were made accordingly; and a translation of the *Novum Organum* was immediately begun. As successive portions were completed, they were forwarded in the first instance to myself; were by me carefully examined; and then passed on to Mr. Ellis, accompanied with copious remarks and suggestions of my own in the way of correction or improvement. Of these corrections Mr. Ellis marked the greater part for adoption, improved upon others, added many of his own, and then returned the manuscript to be put into shape for the printer. But as he was not able to look over it again after it had received the last corrections, and as the translator did not wish to put his own name to it, and as this edition was to contain nothing for which somebody is not personally responsible, I have been obliged to take charge of it myself. In my final revision I have been careful to preserve all Mr. Ellis's corrections which affect the substance and sense of the translation. In matters which concern only the style and manner of expression, I have thought it better to follow my own taste; a mixture of different styles being commonly less agreeable to the reader, and mine (as the case now stands) being necessarily the predominating one. For the same reason I have altered at discretion the translation of the prefaces, &c. which precede the *Novum Organum;* which were done by another hand, and have not had the advantage of Mr. Ellis's revision. For those which follow, the translator (Mr. Francis Headlam, Fellow of University College, Oxford) will himself be responsible.

Though this volume is already twice as thick as I would have had it, I must add a few words concerning the portraits of Bacon; a subject which has not received the attention which it deserves, and upon which, if picture-dealers and collectors and inheritors of family portraits would take an interest in it, some valuable light might probably be thrown.

The portrait in the front of the volume is taken from an old engraving by Simon Pass; which came, (as Mr. Smith of Lisle Street informed me, from whom I bought it some years ago,) out of a broken-up copy of Holland's *Baziliologia*.[1] The original has a border, bearing the words HONORATISS: D^S. FRANCISCUS BACON: EQUES AU: MAG: SIGILL: ANGL: CUST^os. Above are his arms, with the motto MONITI MELIORA. Below the chancellor's bag, on which the left hand rests. These accessories, as being presumably the device of the engraver and not suitable to the modern style which has been preferred for the copy, have been dispensed with; but the inscription underneath has been copied verbatim[2], and enables us to fix the date of the work. Bacon was created Lord Chancellor on the 4th of January, 1617–18, and Baron Verulam on the 12th of the following July; and as it is not to be supposed that his newest title would have been omitted on such an occasion, we may infer with tolerable certainty that the engraving was published during the first half of the year 1618. Below this inscription are engraved in small letters the words "*Simon Passæus sculpsit L. Are to be sould by John Sudbury and George Humble at the signe of the white horse in Pope's head Ally.*" The plate appears to have been used afterwards for a frontispiece to the *Sylva Sylvarum*, which was published in 1627, the year after Bacon's death. At least I have a copy of the second

[1] This work was published in 1618; and though one would not expect from the title to find Bacon there, Brunet mentions a copy in the Biblioth. du Roi at Paris "qui, outre les portraits qui composent ordinairement le recueil, renferme encore d'autres portraits du même genre, representants des reines, des princes du sang, et des seigneurs de la cour des Rois Jacques Ier et Charles I^or," &c. The copy in the British Museum has no portrait of Bacon; but as the plates are not numbered, and there is no table of contents, one cannot be sure that any copy is perfect.

[2] The righte Honourable Sr Frauncis Bacon knight, Lorde highe Chancellour of Englande and one of his Maties most hon^ble privie Counsell.

edition of that work (1628) in which the same print is inserted, only with the border and inscription altered; the title which originally surrounded it, together with the Chancellor's bag and the names of the engraver and publishers, being erased; the coat of arms altered; and the words underneath being changed to *The right Honble Francis Lo. Verulam, Viscount St Alban. Mortuus* 9° *Aprilis, Anno Dñi* 1626, *Annoq. Aetat.* 66. It is probable that the rapid demand for the *Sylva Sylvarum* wore out the plate; for none of the later editions which I have seen contain any portrait at all; and that which was prefixed to the Resuscitatio in 1657, though undoubtedly meant to be a fac-simile of Simon Pass's engraving, has been so much altered in the process of restoration, that I took it for a fresh copy until Mr. Holl showed me that it was only the old plate retouched. The lower part of the face has entirely lost its individuality and physiognomical character; the outline of the right cheek has not been truly followed; that of the nose has lost its shapeliness and delicacy; and the first line-and-half of the inscription underneath has apparently been erased in order to give the name and titles in Latin. Nevertheless the adoption by Dr. Rawley of this print sufficiently authenticates it as a likeness at that time approved; only the likeness must of course be looked for in the plate as Simon Pass left it,—not in restorations or copies. This Mr. Holl has endeavoured faithfully, and in my opinion very successfully, to reproduce; it being understood however that his aim has been to give as exact a resemblance as he could, not of the old engraving (the style of which has little to recommend it), but of the man whom the engraving represents.

I selected this likeness by preference, partly because original impressions are scarce, and none of the others which I have seen give a tolerable idea of it; whereas the rival portrait by Van Somer is very fairly represented by the engraving in Lodge's collection; but chiefly because I have some reason to suspect that it was made from a painting by Cornelius

Janssen, and some hope that the original is still in existence and that this notice may lead to the discovery of it. Janssen is said to have come over to England in 1618, the year in which, as I have said, the engraving must have been published. Bacon did sit for his portrait to somebody (but it may no doubt have been to Van Somer) about that time; at least 33*l*, was "paid to the picture drawer for his Lp's picture," on the 12th of September, 1618.[1] Now I have in my possession an engraving in mezzotinto, purporting to be a portrait of Bacon, representing him in the same position and attitude, and the same dress (only that the figure on the vest is different), and having a similar oval frame with the same kind of border. In the left-hand corner, where the painter's name is usually given, are the words *Cornelius Johnson pinxit.* The engraver's name is not stated; but there is evidence on the face of the work that he was a poor performer. In all points which require accuracy of eye and hand, and a feeling of the form to be described, it differs much from Pass's work, and is very inferior; but in those which the most unskilful artist need never miss, — such as the quantity of face shown, the disposition of the hair, and generally what may be called the *composition* of the picture, — there is no more difference between the two than may be well accounted for by the difficulty which is often found in ascertaining the true outlines of the obscure parts of a dark or damaged picture, or by the alterations which an engraver will often introduce when the size of his plate obliges him to cut off the lower part of the figure. The hat, for instance, which is dark against a dark background, sits differently on the head; sits in fact (in the mezzotint) as it could not possibly have done in nature; and the flap of the brim follows a somewhat different line, though the irregularity is of the same kind; also the light and shadow are differently distributed over the folds of the frill; the fur hangs differently; the figure is cut off too short to admit the

[1] See a book of accounts preserved in the State Paper Office.

hand; and the ribbon round the neck, the lower part of which is concealed in Pass's print, is changed into a George and Garter.[1] But such varieties as these are of ordinary occurrence in copies of the same picture by different hands; especially where one copier is attending chiefly to the outlines of the forms without caring to represent the effect of the picture (the practice I think of engravers in Simon Pass's time), and the other is attending to the effect of the picture without caring, or without being able, to preserve the individual details, according to the practice of the popular engravers of the eighteenth century; whereas in two independent and original portraits of the same face the correspondencies which I have mentioned can hardly occur. But however that may be, this mezzotinto appears at least to prove that when it was made there was in existence a portrait which somebody believed to be a portrait of Bacon by Cornelius Johnson,—that is (no doubt) Cornelius Janssen. When it was made becomes therefore an interesting question; and I regret to say that it is a question which I have no data for determining, beyond the fact that it is in mezzotinto (an art of comparatively modern invention); that it was "sold by J. Cooper in James Street Covent Garden;" and that there was an English engraver called Richard Cooper, who flourished about the year 1763, and among whose engravings a portrait of Francis Bacon Lord Keeper and Chancellor is mentioned as one.[2]

With reference to this subject of portraits, I may add that the various engravings of Bacon are all (with one exception which I will mention presently) derived directly or through successive copies from one or other of two originals. One is Simon Pass's print; the features of which may be traced through many generations of copies, each less like than its predecessor; though always to be identified by the hat with irregular brim curving *upwards* towards the sides, and

[1] If the original picture really has this badge, we may conclude, I suppose, that it was not a portrait of Bacon at all. And I should not be very much surprised if it turned out to be a Charles I.

[2] See Bryan's *Painters and Engravers*.

bound with a scarf. The other is a portrait by Van Somer; the same I suppose that Aubrey saw at Gorhambury in 1656; which has become the parent of two separate families; one wearing a hat with a brim describing a regular curve *downwards* towards the sides, which sufficiently distinguishes it from Pass's portrait; the other without any hat; the composition being in other respects the same. Of both these the originals are at Gorhambury; and they are both ascribed to Van Somer. But the latter is so very inferior to the former in every quality of art, that unless there be some evidence of the fact more to be relied on than an ordinary family tradition, I shall never be able to believe that it is by the same hand. It seems to me far more probable that at some later period when the fashion of painting people with the head covered had gone out, some one, wishing to have a portrait of Bacon without his hat, employed the nearest artist to make a copy of Van Somer's picture (Van Somer himself died in 1621, two or three years after it was painted, about the time when Bacon was in the Tower) with that alteration; and that this is the work he produced. That he was not a skilful artist is sufficiently apparent from the execution of those parts which were intended to be copies; the peculiar character and expression of eyebrows, eyes, nose and mouth, being entirely missed; and the whole handling being weak and poor, and without any sense of form. Moreover the hair is of a different texture; and although we have neither any description nor any drawing of the upper part of Bacon's full-grown head, we know what it was like in his boyhood from two very admirable representations, quite independent of each other and yet exactly agreeing; and it is plain that such a head could never have grown into a shape at all like that which the painter has invented.

However, they were both called portraits by Van Somer; and the first (which is a very good work, as far as the painting goes) was engraved by Houbraken; the last by Vertue. Unfortunately, these two artists, whose style of

execution made them very popular and gave them almost a monopoly of English historical portraiture in the 18th century, were both utterly without conscience in the matter of likeness. And though many of their works are brilliant specimens of effect in line-engraving, yet regarded as likenesses of the men, they are all alike worse than worthless. The original from which Vertue's engraving of Bacon was taken, being itself destitute of all true physiognomical character, is indeed represented well enough. But if any one wishes to form a notion of Bacon's face as interpreted by Van Somer, he must consult the more modern engraving in Lodge's collection, which is at least a conscientious attempt to translate it faithfully; Houbraken's can only mislead him.

The other engraving to which I have alluded as not derived from either of the originals above mentioned, is the small head engraved for Mr. Montagu's edition of Bacon's works. This was taken from a miniature by Hilliard then in the possession of John Adair Hawkins, Esq., representing Bacon in his eighteenth year; a work of exquisite beauty and delicacy. But here also, I regret to say, the laudable attempt to bring an image of it within reach of the general public has been attended with the same infelicity. The engraver has so completely failed to catch either expression, feature, character, or drawing, that I think no one can have once seen the original without wishing, in justice both to subject and artist, that no one who has not seen it may ever see the copy.

Judging from the issue of Mr. Montagu's attempt to obtain an engraving of this miniature, it is perhaps fortunate that he did not fulfil the intention which he announced of giving an engraving of a bust in terra cotta representing Bacon in his twelfth year, which is at Gorhambury, in the possession of the Earl of Verulam. But this also is a work of great merit, and extremely interesting. It is coloured, and (like Hilliard's miniature) shows the head. I have been told by artists that it is probably of Italian workmanship;

and certainly the work of an accomplished sculptor, who had a delicate perception of form and character. A faithful representation of it would be one of the most valuable contributions which could be made to our collections of the faces of memorable men.

There are other portraits of Bacon in existence, but I have not myself seen any which can be relied upon as authentic or which appear to have any independent value. If the foregoing remarks should be the means of bringing any such out of their hiding-places, I shall think them well bestowed; and I need scarcely add that I should be most happy to receive any communication on the subject, and to afford what help I can towards putting them in their true light.

JAMES SPEDDING.

60. Lincoln's Inn Fields, January, 1857.

ERRATA.

	for	*read*
Vol. I. p. 46. note 4 -	Erdman - -	Erdmann.
72. note 1. -	naturale - -	naturali.
75. note 1. -	74. - - -	73.
76. note 1. -	law of gravitation -	those laws.
210. note 2. -	Aughiera - -	Anghiera.
218. note 1. line 11.	vel - - -	id.
242. note 2. -	a molluscous animal ... is ... it derives ... it -	serpent medusæ ... are ... they derive ... them.
327. note 3. -	*Pancosmias* -	*Pancosmia.*
338. line 1. -	Sic - - -	Sit.
577. line 19. -	dele 3.	
758. line 5. -	homino - -	homini.
771. note 5. -	κρότν - - -	κρότον.

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THE

LIFE

OF

THE RIGHT HONOURABLE

FRANCIS BACON,

BARON OF VERULAM, VISCONNT ST. ALBAN.

BY

WILLIAM RAWLEY, D.D.

HIS LORDSHIP'S FIRST AND LAST CHAPLAIN AND OF LATE HIS MAJESTIES CHAPLAIN IN ORDINARY.

[This is the title of an edition printed in 1670, after Dr. Rawley's death, and prefixed to the ninth edition of the *Sylva Sylvarum*. The text of the Life itself is taken from the second edition of the *Resuscitatio*, the latest with which Rawley had anything to do. I have, however, modernised the spelling; altered at discretion the typographical arrangement as to capitals, italics, and punctuation, which is very perplexing to a modern eye and has nothing to recommend it; and added the notes.—*J. S.*]

THE LIFE

OF

THE HONOURABLE AUTHOR.[1]

FRANCIS BACON, the glory of his age and nation, the adorner and ornament of learning, was born in York House, or York Place, in the Strand, on the two and twentieth day of January, in the year of our Lord 1560. His father was that famous counsellor to Queen Elizabeth, the second prop of the kingdom in his time, Sir Nicholas Bacon, knight, lord-keeper of the great seal of England; a lord of known prudence, sufficiency, moderation, and integrity. His mother was Anne, one of the daughters of Sir Anthony Cook; unto whom the erudition of King Edward the Sixth had been committed; a choice lady, and eminent for piety, virtue, and learning; being exquisitely skilled, for a woman, in the Greek and Latin tongues. These being the parents, you may easily imagine what the issue was like to be; having had whatsoever nature or breeding could put into him.

His first and childish years were not without some mark of eminency; at which time he was endued with that pregnancy and towardness of wit, as they were presages of that deep and universal apprehension which was manifest in him afterward; and caused him to be taken notice of by several persons of worth and place, and especially by the queen; who (as I have been informed) delighted much then to confer with him, and to

[1] This Life was first published in 1657, as an introduction to the volume entitled "Resuscitatio; or bringing into public light several pieces of the works, civil, historical, philosophical, and theological, hitherto sleeping, of the Right Honourable Francis Bacon, Baron of Verulam, Viscount St. Alban; according to the best corrected copies." Of this volume a second edition, or rather a re-issue with fresh titlepage and dedication, and several sheets of new matter inserted, appeared in 1661; the "Life of the Honourable Author" being prefixed as before, and not altered otherwise than by the introduction of three new sentences; to make room for which two leaves were cancelled. A third edition was brought out in 1671 by the original publisher, containing a good deal of new matter; for which however Dr. Rawley, who died in 1667, is not answerable.

prove him with questions; unto whom he delivered himself with that gravity and maturity above his years, that Her Majesty would often term him, *The young Lord-keeper.* Being asked by the queen *how old he was,* he answered with much discretion, being then but a boy, *That he was two years younger than Her Majesty's happy reign;* with which answer the queen was much taken.[1]

At the ordinary years of ripeness for the university, or rather something earlier, he was sent by his father to Trinity College, in Cambridge[2], to be educated and bred under the tuition of Doctor John White-gift, then master of the college; afterwards the renowned archbishop of Canterbury; a prelate of the first magnitude for sanctity, learning, patience, and humility; under whom he was observed to have been more than an ordinary proficient in the several arts and sciences. Whilst he was commorant in the university, about sixteen years of age, (as his lordship hath been pleased to impart unto myself), he first fell into the dislike of the philosophy of Aristotle; not for the worthlessness of the author, to whom he would ever ascribe all high attributes, but for the unfruitfulness of the way; being a philosophy (as his lordship used to say) only strong for disputations and contentions, but barren of the production of works for the benefit of the life of man; in which mind he continued to his dying day.

After he had passed the circle of the liberal arts, his father thought fit to frame and mould him for the arts of state; and for that end sent him over into France with Sir Amyas Paulet then employed ambassador lieger into France[3]; by whom he was after awhile held fit to be entrusted with some message or advertisement to the queen; which having performed with great approbation, he returned back into France again, with intention to continue for some years there. In his absence in France his father the lord-keeper died[4], having collected (as I

[1] This last sentence was added in the edition of 1661. The substance of it had appeared before in the Latin Life prefixed to the *Opuscula Philosophica* in 1658, which is only a free translation of this, with a few corrections.

[2] He began to reside in April 1573; was absent from the latter end of August 1574 till the beginning of March, while the plague raged; and left the university finally at Christmas 1575, being then on the point of sixteen. See Whitgift's accounts, printed in the *British Magazine*, vol. xxxii. p. 365., and xxxiii. p. 444.

[3] Sir Amyas landed at Calais on the 25th of September 1576, and succeeded Dr. Dale as ambassador in France in the following February. See *Burghley's Diary*, Murdin, pp. 778, 779.

[4] In February 1578-9.

have heard of knowing persons) a considerable sum of money, which he had separated, with intention to have made a competent purchase of land for the livelihood of this his youngest son (who was only unprovided for; and though he was the youngest in years, yet he was not the lowest in his father's affection); but the said purchase being unaccomplished at his father's death, there came no greater share to him than his single part and portion of the money dividable amongst five brethren; by which means he lived in some straits and necessities in his younger years. For as for that pleasant site and manor of Gorhambury, he came not to it till many years after, by the death of his dearest brother, Mr. Anthony Bacon[1], a gentleman equal to him in height of wit, though inferior to him in the endowments of learning and knowledge; unto whom he was most nearly conjoined in affection, they two being the sole male issue of a second *venter*.

Being returned from travel, he applied himself to the study of the common law, which he took upon him to be his profession[2]; in which he obtained to great excellency, though he made that (as himself said) but as an accessary, and not his principal study. He wrote several tractates upon that subject: wherein, though some great masters of the law did out-go him in bulk, and particularities of cases, yet in the science of the grounds and mysteries of the law he was exceeded by none. In this way he was after awhile sworn of the queen's council learned, extraordinary; a grace (if I err not) scarce known before.[3] He seated himself, for the commodity of his studies and

[1] Anthony Bacon died in the spring of 1601. See a letter from Mr. John Chamberlain to Sir Dudley Carlton, in the State Paper Office, dated 27th May 1601.

[2] He had been admitted to Gray's Inn as "ancient" on the 21st of November 1576; commenced his regular career as a student in 1579; became "utter barrister" on the 27th of June 1582; bencher in 1586; reader in 1588; and double reader in 1600. See Harl. MSS. 1912.

[3] In the Latin version of this memoir, for "after a while" Rawley substitutes *nondum tyrocinium in lege egressus*, by which he seems to assign a very early period as the date of this appointment. But I suspect he was mistaken, both as to the date and the nature of it. The title he got no doubt from a letter addressed by Bacon to King James, about the end of January 1620–1. "You found me of the Learned Council, Extraordinary, without patent or fee, a kind of *individuum vagum*. You established me and brought me into Ordinary." Coupling this probably with an early but undated letter to Burghley, in which Bacon thanks the queen for "appropriating him to her service," he imagined that the thanks were for the appointment in question. This however is incredible. A copy of this letter in the Lansdowne Collection gives the date, — 18 October 1580; at which time Bacon had not been even a student of law for more than a year and a half, and could not therefore have been qualified for such a place; still less could such a distinction have been conferred upon him without being much talked of at the time and continually referred to afterwards. Moreover, we have another letter of Bacon's to King James,

practice, amongst the Honourable Society of Gray's-Inn, of which house he was a member; where he erected that elegant pile or structure commonly known by the name of *The Lord Bacon's Lodgings*, which he inhabited by turns the most part of his life (some few years only excepted) unto his dying day. In which house he carried himself with such sweetness, comity, and generosity, that he was much revered and beloved by the readers and gentlemen of the house.

Notwithstanding that he professed the law for his livelihood and subsistence, yet his heart and affection was more carried after the affairs and places of estate; for which, if the majesty royal then had been pleased, he was most fit. In his younger years he studied the service and fortunes (as they call them) of that noble but unfortunate earl, the Earl of Essex; unto whom he was, in a sort, a private and free counsellor, and gave him safe and honourable advice, till in the end the earl inclined too much to the violent and precipitate counsel of others his adherents and followers; which was his fate and ruin.[1]

His birth and other capacities qualified him above others of his profession to have ordinary accesses at court, and to come frequently into the queen's eye, who would often grace him with private and free communication, not only about matters of his profession or business in law, but also about the arduous affairs of estate; from whom she received from time to time

written in 1606, in which he speaks of his "*nine* years' service of the crown." This would give 1597 as the year in which he began to serve as one of the learned council; at which time it was no extraordinary favour, seeing that he had been recommended for solicitor-general three or four years before, both by Burghley and Egerton. It appears however to have been no regular or formal appointment. He was not sworn. He had no patent; not even a written warrant. His tenure was only *ratione verbi regii Elizabethæ* (see Rymer, A. D. 1604, p. 121.). Elizabeth, who "looked that her word should be a warrant," chose to employ him in the business which belonged properly to her learned council, and he was employed accordingly. His first service of that nature,—the first at least of which I find any record,—was in 1594. In 1597 he had come to be employed regularly, and so continued till the end of the reign, and was familiarly spoken of as "Mr. Bacon of the learned council."

[1] The connexion between Bacon and Essex appears to have commenced about the year 1590 or 1591, and furnishes matter for a long story — too long to be discussed in a note. His conduct was much misunderstood at the time by persons who had no means of knowing the truth, and has been much misrepresented since by writers who cannot plead that excuse. The case is not however one on which a unanimous verdict can be expected. Always, where choice has to be made between fidelity to the state and fidelity to a party or person, popular sympathy will run in favour of the man who chooses the narrower duty; for the narrower duty is not only easier to comprehend, but, being seen closer, *appears* the larger of the two. But though sentiments will continue to be divided, facts may be agreed upon; and for the correction of all errors in matter of fact, I must refer to the Occasional Works, where the whole story will necessarily come out in full detail. In the mean time I may say for myself that I have no fault to find with Bacon for any part of his conduct towards Essex, and I think many people will agree with me when they see the case fairly stated.

great satisfaction. Nevertheless, though she cheered him much with the bounty of her countenance, yet she never cheered him with the bounty of her hand; having never conferred upon him any ordinary place or means of honour or profit, save only one dry reversion of the Register's Office in the Star Chamber, worth about 1600*l. per annum*, for which he waited in expectation either fully or near twenty years[1]; of which his lordship would say in Queen Elizabeth's time, *That it was like another man's ground buttalling upon his house, which might mend his prospect, but it did not fill his barn;* (nevertheless, in the time of King James it fell unto him); which might be imputed, not so much to Her Majesty's averseness and disaffection towards him, as to the arts and policy of a great statesman then, who laboured by all industrious and secret means to suppress and keep him down; lest, if he had risen, he might have obscured his glory.[2]

But though he stood long at a stay in the days of his mistress Queen Elizabeth, yet after the change, and coming in of his new master King James, he made a great progress; by whom he was much comforted in places of trust, honour, and revenue. I have seen a letter of his lordship's to King James, wherein he makes acknowledgment, *That he was that master to him, that had raised and advanced him nine times; thrice in dignity, and six times in office.* His offices (as I conceive) were Counsel Learned Extraordinary[3] to His Majesty, as he had been to Queen Elizabeth; King's Solicitor-General; His Majesty's Attorney-General; Counsellor of Estate, being yet but Attorney; Lord-Keeper of the Great Seal of England; lastly, Lord Chancellor; which two last places, though they be the same in authority and power, yet they differ in patent, height, and favour of the prince; since whose time none of his successors, until

[1] The reversion, for which he considered himself indebted to Burghley, was granted to him in October 1589. He succeeded to the office in July 1608. In the Latin version Rawley adds that he administered it by deputy.

[2] The person here alluded to is probably his cousin Robert Cecil, who, though he always professed an anxiety to serve him, was supposed (apparently not without reason) to have thrown obstacles secretly in the way of his advancement.

[3] See note 3. p. 5. Rawley should rather have said "counsel learned, *no longer extraordinary.*" It is true indeed that King James did at his first entrance confirm Bacon by warrant under the sign manual in the same office which he had held under Elizabeth by special commandment. But it was the "establishing him and bringing him into *ordinary*" with a salary of 40*l.*, which he reckons as first in the series of advancements. This was in 1604. He was made solicitor in 1607, attorney in 1613, counsellor of state in 1616, lord-keeper in 1617, lord chancellor in 1618. His successive dignities were conferred respectively in 1603, 1618, and 1620–1.

this present honourable lord[1], did ever bear the title of Lord Chancellor. His dignities were first Knight, then Baron of Verulam; lastly, Viscount St. Alban; besides other good gifts and bounties of the hand which His Majesty gave him, both out of the Broad Seal and out of the Alienation Office[2], to the value in both of eighteen hundred pounds per annum; which, with his manor of Gorhambury, and other lands and possessions near thereunto adjoining, amounting to a third part more, he retained to his dying day.

Towards his rising years, not before, he entered into a married estate, and took to wife Alice, one of the daughters and coheirs of Benedict Barnham, Esquire and Alderman of London; with whom he received a sufficiently ample and liberal portion in marriage.[3] Children he had none; which, though they be the means to perpetuate our names after our deaths, yet he had other issues to perpetuate his name, the issues of his brain; in which he was ever happy and admired, as Jupiter was in the production of Pallas. Neither did the want of children detract from his good usage of his consort during the intermarriage, whom he prosecuted with much conjugal love and respect, with many rich gifts and endowments, besides a robe of honour which he invested her withal; which she wore unto her dying day, being twenty years and more after his death.[4]

The last five years of his life, being withdrawn from civil affairs[5] and from an active life, he employed wholly in contem-

[1] Sir Edward Hyde, made Lord Chancellor June 1. 1660. This clause was added in 1661; the leaf having been cancelled for the purpose.

[2] Here the paragraph ended in the first edition. The rest was added in 1661.

[3] It appears, from a manuscript preserved in Tenison's Library, that he had about 220*l.* a-year with his wife, and upon her mother's death was to have about 140*l.* a-year more.

[4] By the "robe of honour" is meant, I presume, the title of viscountess. It appears however that a few months before Bacon's death his wife had given him some cause of grave offence. Special provision is made for her in the body of his will, but revoked in a codicil, "for just and great causes," the nature of which is not specified. Soon after his death she married Sir John Underwood, her gentleman-usher. She was buried at Eyworth in Bedfordshire on the 29th of June 1650.

[5] On the 3rd of May 1621, Bacon was condemned, upon a charge of corruption to which he pleaded guilty, to pay a fine of 40,000*l.*; to be imprisoned in the Tower during the king's pleasure; to be for ever incapable of sitting in parliament or holding office in the state; and to be banished for life from the verge of the court. From that time his only business was to find means of subsistence and of satisfying his creditors, and to pursue his studies.

His offence was the taking of presents from persons who had suits in his court, in some cases while the suit was still pending; an act which undoubtedly amounted to corruption as corruption was defined by the law. The degree of *moral* criminality involved in it is not so easily ascertained. To judge of this, we should know, First, what was the understanding, open or secret, upon which the presents were given and taken, — for a gift, though it be given to a judge, is not necessarily in the nature of a bargain to pervert

plation and studies—a thing whereof his lordship would often speak during his active life, as if he affected to die in the shadow and not in the light; which also may be found in several passages of his works. In which time he composed the greatest part of his books and writings, both in English and Latin, which I will enumerate (as near as I can) in the just order wherein they were written[1]:— *The History of the Reign of King Henry the Seventh; Abcedarium Naturæ,* or a Metaphysical piece which is lost[2]; *Historia Ventorum; Historia Vitæ et Mortis; Historia Densi et Rari,* not yet printed[3]; *Historia Gravis et Levis,* which is also lost[4]; *a Discourse of a War with Spain; a*

justice: Secondly, to what extent the practice was prevalent at the time,—for it is a rare virtue in a man to resist temptations to which all his neighbours yield: Thirdly, how far it was *tolerated,*—for a practice may be universally condemned and yet universally tolerated; people may be known to be guilty of it and yet received in society all the same: Fourthly, how it stood with regard to other abuses prevailing at the same time,—for it is hard to reform all at once, and it is one thing for a man to leave a single abuse unreformed while he is labouring to remove or resist greater ones, and another thing to introduce it anew, or to leave all as it was, making no effort to remove any. Now all this is from the nature of the case very difficult to ascertain. But the whole question, as it regards Bacon's character, must be considered in connexion with the rest of his political life, and will be fully discussed in its place in the Occasional works; where all the evidence I can find shall be faithfully exhibited. In this place it may be enough to say that he himself always admitted the taking of presents as he had taken them to be indefensible, the sentence to be just, and the example salutary; and yet always denied that he had been an unjust judge, or "had ever had bribe or reward in his eye or thought when he pronounced any sentence or order;" and that I cannot find any reason for doubting that this was true. It is stated, indeed, in a manuscript of Sir Matthew Hale's, published by Hargrave, that the censure of Bacon "for many decrees made upon most gross bribery and corruption . . . . gave such a discredit and brand to the decrees thus obtained that they were easily set aside;" and it is true that some bills were brought into the House of Commons *for the purpose* of setting aside such decrees; but I cannot find that any one of them reached a third reading; and it is clear from Sir Matthew's own argument that he could not produce an instance of one reversed by the House of Lords; and if any had been reversed by a royal commission appointed for the purpose (which according to his statement was the only remaining way), it must surely have been heard of; yet where is the record of any such commission? Now if of all the decrees so discredited none were reversed, it is difficult to resist the conclusion that they had all been made *bonâ fide* with régard only to the merits of the cases, and were in fact unimpeachably just; and we may believe that Bacon pronounced a true judgment on his own case when he said to his friends (as I find it recorded in a commonplace of Dr. Rawley's in the Lambeth Library), "I was the justest judge that was in England these fifty years; but it was the justest censure in parliament that was these two hundred years."

[1] In the Latin version Rawley adds, *quam præsens observavi;* which gives this list a peculiar value.

[2] A fragment of this piece was recovered and printed by Tenison in the *Baconiana;* and will appear in this edition after the *Historia Ventorum,* which it was intended to accompany.

[3] This was true in 1657; but it was printed the next year in the *Opuscula Philosophica;* and, therefore, for "not yet printed," the Latin version substitutes *jam primum typis mandata.* In the edition of 1661 a corresponding alteration ought to have been made in the English, but was not; and as the words occur in one of the cancelled leaves they must have been left by oversight.

[4] This was probably the tract which Gruter says he once had in his hands, and which he describes as merely a skeleton, exhibiting heads of chapters not filled up. "*De Gravi et Levi in manibus habui integrum et grande volumen, sed quod, præter*

Dialogue touching an Holy War; the Fable of the New Atlantis; a Preface to a Digest of the Laws of England; the beginning of the History of the Reign of King Henry the Eighth; De Augmentis Scientiarum, or the Advancement of Learning, put into Latin [1], with several enrichments and enlargements; *Counsels Civil and Moral,* or his book of *Essays,* likewise enriched and enlarged; *the Conversion of certain Psalms into English Verse; the Translation into Latin of the History of King Henry the Seventh, of the Counsels Civil and Moral* [2], *of the Dialogue of the Holy War, of the Fable of the New Atlantis,* for the benefit of other nations [3]; his revising of his book *De Sapientiâ Veterum; Inquisitio de Magnete; Topica Inquisitionis de Luce et Lumine;* both these not yet printed [4]; lastly, *Sylva Sylvarum,* or *the Natural History.* These were the fruits and productions of his last five years. His lordship also designed, upon the motion and invitation of his late majesty, to have written the reign of King Henry the Eighth; but that work perished in the designation merely, God not lending him life to proceed farther upon it than only in one morning's work; whereof there is extant an *ex ungue leonem,* already printed in his lordship's *Miscellany Works.*

There is a commemoration due as well to his abilities and virtues as to the course of his life. Those abilities which commonly go single in other men, though of prime and observable parts, were all conjoined and met in him. Those are, *sharpness of wit, memory, judgment,* and *elocution.* For the former three his books do abundantly speak them; which [5] with what

nudam delineatæ fabricæ compagem ex titulis materiam prout eam conceperat Baconus absolventibus, nihil descriptionis continebat." See his letter to Rawley, May 29. 1652, in the *Baconiana,* p. 223.

[1] In this edition I have placed the *De Augmentis* before the *Historia Ventorum;* because, though published after, it was prepared and arranged, and in that sense composed, before. And in this view I am supported by a slight variation which is introduced here in the Latin version, viz. "Intervenerat *opus de Augmentis Scientiarum,*" &c.

We learn also from the Latin version that Bacon worked at the translation of the *Advancement of Learning* himself: *in quo e linguâ vernaculâ,* proprio Marte, *in Latinam transferendo honoratissimus auctor plurimum desudavit.*

[2] These were the Essays as they appeared in the third and last edition; but he gave them a weightier title when he had them translated into "the general language:" *exinde dicti, sermones fideles, sive interiora rerum.*

[3] The Latin version adds, *apud quos expeti audiverat.*

[4] These words are omitted in the Latin version, and must have been left by oversight in the edition of 1661; for they occur in one of the cancelled leaves; and the works in question had been printed in 1658. The error is the more worth noticing because it shows that wherever the English and the Latin differ, the Latin must be regarded as the later and better authority.

[5] The Latin version adds, *ut de Julio Cæsare Hirtius.*

sufficiency he wrote, let the world judge; but with what celerity he wrote them, I can best testify. But for the fourth, his *elocution*, I will only set down what I heard Sir Walter Raleigh once speak of him by way of comparison (whose judgment may well be trusted), *That the Earl of Salisbury was an excellent speaker, but no good penman; that the Earl of Northampton (the Lord Henry Howard) was an excellent penman, but no good speaker; but that Sir Francis Bacon was eminent in both.*

I have been induced to think, that if there were a beam of knowledge derived from God upon any man in these modern times, it was upon him. For though he was a great reader of books, yet he had not his knowledge from books[1], but from some grounds and notions from within himself; which, notwithstanding, he vented with great caution and circumspection. His book of *Instauratio Magna*[2] (which in his own account was the chiefest of his works) was no slight imagination or fancy of his brain, but a settled and concocted notion, the production of many years' labour and travel. I myself have seen at the least twelve copies of the *Instauration*, revised year by year one after another, and every year altered and amended in the frame thereof, till at last it came to that model in which it was committed to the press; as many living creatures do lick their young ones, till they bring them to their strength of limbs.

In the composing of his books he did rather drive at a masculine and clear expression than at any fineness or affectation of phrases, and would often ask if the meaning were expressed plainly enough, as being one that accounted words to be but subservient or ministerial to matter, and not the principal. And if his style were polite[3], it was because he would do no otherwise. Neither was he given to any light conceits, or descanting upon words, but did ever purposely and industriously avoid them; for he held such things to be but digressions or diversions from the scope intended, and to derogate from the weight and dignity of the style.

[1] *i. e.* not from books *only: Ex libris tamen solis scientiam suam deprompsisse haudquaquam concedere licet.*

[2] For *Instauratio Magna* in this place, and also for *Instauration* a few lines further on, the Latin version substitutes *Novum Organum.* Rawley, when he spoke of the *Instauration*, was thinking, no doubt, of the volume in which the *Novum Organum* first appeared, and which contains all the pieces that stand in this edition before the *De Augmentis.*

[3] The Latin version adds: *Siquidem apud nostrates eloquii Anglicani artifex habitus est.*

He was no plodder upon books; though he read much, and that with great judgment, and rejection of impertinences incident to many authors; for he would ever interlace a moderate relaxation of his mind with his studies, as walking, or taking the air abroad in his coach [1], or some other befitting recreation; and yet he would lose no time, inasmuch as upon his first and immediate return he would fall to reading again, and so suffer no moment of time to slip from him without some present improvement.

His meals were refections of the ear as well as of the stomach, like the *Noctes Atticæ*, or *Convivia Deipno-sophistarum*, wherein a man might be refreshed in his mind and understanding no less than in his body. And I have known some, of no mean parts, that have professed to make use of their note-books when they have risen from his table. In which conversations, and otherwise, he was no dashing man [2], as some men are, but ever a countenancer and fosterer of another man's parts. Neither was he one that would appropriate the speech wholly to himself, or delight to outvie others, but leave a liberty to the co-assessors to take their turns. Wherein he would draw a man on and allure him to speak upon such a subject, as wherein he was peculiarly skilful, and would delight to speak. And for himself, he contemned no man's observations, but would light his torch at every man's candle.

His opinions and assertions were for the most part binding, and not contradicted by any; rather like oracles than discourses; which may be imputed either to the well weighing of his sentence by the scales of truth and reason, or else to the reverence and estimation wherein he was commonly had, that no man would contest with him; so that there was no argumentation, or *pro* and *con* (as they term it), at his table: or if there chanced to be any, it was carried with much submission and moderation.

I have often observed, and so have other men of great account, that if he had occasion to repeat another man's words after him, he had an use and faculty to dress them in better vestments and

[1] In the Latin version Rawley adds gentle exercise on horseback and playing at bowls: *Equitationem, non citam sed lentam, globorum lusum, et id genus exercitia.*

[2] The word *dash* is used here in the same sense in which Costard uses it in *Love's Labour's Lost*: "There, an't please you; a foolish, mild man; an honest man, look you, and soon *dashed*:" Rawley means that Bacon was not a man who used his wit, as some do, to put his neighbours out of countenance: *Convivantium neminem aut alios colloquentium* pudore suffundere *gloriæ sibi duxit, sicut nonnulli gestiunt.*

apparel than they had before; so that the author should find his own speech much amended, and yet the substance of it still retained[1]; as if it had been natural to him to use good forms, as Ovid spake of his faculty of versifying,

"Et quod tentabam scribere, versus erat."

When his office called him, as he was of the king's council learned, to charge any offenders, either in criminals or capitals, he was never of an insulting and domineering nature over them, but always tender-hearted, and carrying himself decently towards the parties (though it was his duty to charge them home), but yet as one that looked upon the *example* with the eye of severity, but upon the *person* with the eye of pity and compassion. And in civil business, as he was counsellor of estate, he had the best way of advising, not engaging his master in any precipitate or grievous courses, but in moderate and fair proceedings: the king whom he served giving him this testimony, *That he ever dealt in business* suavibus modis; *which was the way that was most according to his own heart.*

Neither was he in his time less gracious with the subject than with his sovereign. He was ever acceptable to the House of Commons[2] when he was a member thereof. Being the king's attorney, and chosen to a place in parliament, he was allowed and dispensed with to sit in the House; which was not permitted to other attorneys.

[1] This is probably the true explanation of a habit of Bacon's which seems at first sight a fault, and perhaps sometimes is; and of which a great many instances have been pointed out by Mr. Ellis; — a habit of inaccurate quotation. In quoting an author's words, — especially where he quotes them merely by way of voucher for his own remark, or in acknowledgment of the source whence he derived it, or to suggest an allusion which may give a better effect to it, — he very often quotes inaccurately. Sometimes, no doubt, this was unintentional, the fault of his memory; but more frequently, I suspect, it was done deliberately, for the sake of presenting the substance in a better form, or a form better suited to the particular occasion. In citing the evidence of witnesses, on the contrary, in support of a narrative statement or an argument upon matter of fact, he is always very careful.

[2] The Latin version adds, *in quo sæpe peroravit, non sine magno applausu;* a statement of the truth of which abundant evidence may be found in all the records which remain of the proceedings of the House of Commons. The first parliament in which he sate was that of 1584: after which he sate in every parliament that was summoned up to the time of his fall.

As an edition of Bacon would hardly be complete unless it contained Ben Jonson's famous description of his manner of speaking, I shall insert it here: — "Yet there happened in my time one noble speaker, who was full of gravity in his speaking. His language (where he could spare or pass by a jest) was nobly censorious. No man ever spake more neatly, more pressly, more weightily, or suffered less emptiness, less idleness, in what he uttered. No member of his speech but consisted of his own graces. His hearers could not cough, or look aside from him, without loss. He commanded where he spoke; and had his judges angry and pleased at his devotion. No man had

And as he was a good servant to his master, being never in nineteen years' service (as himself averred) rebuked by the king for anything relating to His Majesty, so he was a good master to his servants, and rewarded their long attendance with good places freely[1] when they fell into his power; which was the cause that so many young gentlemen of blood and quality sought to list themselves in his retinue. And if he were abused by any of them in their places, it was only the error of the goodness of his nature, but the badges of their indiscretions and intemperances.

This lord was religious: for though the world be apt to suspect and prejudge great wits and politics to have somewhat of the atheist, yet he was conversant with God, as appeareth by several passages throughout the whole current of his writings. Otherwise he should have crossed his own principles, which were, *That a little philosophy maketh men apt to forget God, as attributing too much to second causes; but depth of philosophy bringeth a man back to God again.* Now I am sure there is no man that will deny him, or account otherwise of him, but to have him been a deep philosopher. And not only so; but he was able *to render a reason of the hope which was in him*, which that writing of his of the *Confession of the Faith* doth abundantly testify. He repaired frequently, when his health would permit him, to the service of the church, to hear sermons, to the administration of the sacrament of the blessed body and blood of Christ; and died in the true faith, established in the church of England.

This is most true — he was free from malice, which (as he said himself) *he never bred nor fed.*[2] He was no revenger of

their affections more in his power. The fear of every man that heard him was, lest he should make an end." — *Discoveries:* under title *Dominus Verulamius.*

[1] *Gratis*, in the Latin version; *i.e.* without taking any money for them; an unusual thing in Bacon's time, when the sale of offices was a principal source of all great men's incomes.

[2] "He said he had breeding swans and feeding swans; but for malice, he neither bred it nor fed it." From a commonplace book of Dr. Rawley's in the Lambeth Library. "Et posso dir," says Sir Tobie Matthew, in his dedication to Cosmo de' Medici of an Italian translation of the *Essays* and *Sapientia Veterum*, 1618, "et posso dir con verità (per haver io havuto l' honore di pratticarlo molti anni, et quando era *in minoribus*, et hora quando sta in colmo et fiore della sua grandezza) di non haver mai scoperto in lui animo di vendetta, per qualsivoglia aggravio che se gli fosse fatto; nè manco sentito uscirgli di bocca parola d' ingiuria contra veruno, che mi paresse venire da passione contra la tal persona; ma solo (et questo ancora molto scarsamente) per giudicio fattone in sangue freddo. Non è già la sua grandezza quel che io ammiro, ma la sua virtù; non sono li favori fattimi da lui (per infiniti che siano) che mi hanno posto il cuore in questi ceppi et catene in che mi ritrovo; ma si bene il suo procedere in commune; che se egli fosse di conditione inferiore, non potrei manco honorarlo, e se mi fosse nemico io dovrei con tutto ciò amar et procurar di servirlo."

injuries; which if he had minded, he had both opportunity and place high enough to have done it. He was no heaver of men out of their places, as delighting in their ruin and undoing. He was no defamer of any man to his prince. One day, when a great statesman was newly dead, that had not been his friend, the king asked him, *What he thought of that lord which was gone?* he answered, *That he would never have made His Majesty's estate better, but he was sure he would have kept it from being worse;* which was the worst he would say of him: which I reckon not among his moral, but his Christian virtues.

His fame is greater and sounds louder in foreign parts abroad, than at home in his own nation; thereby verifying that divine sentence, *A prophet is not without honour, save in his own country, and in his own house.* Concerning which I will give you a taste only, out of a letter written from Italy (the store-house of refined wits) to the late Earl of Devonshire, then the Lord Candish: *I will expect the new essays of my Lord Chancellor Bacon, as also his History, with a great deal of desire, and whatsoever else he shall compose: but in particular of his History I promise myself a thing perfect and singular, especially in Henry the Seventh, where he may exercise the talent of his divine understanding. This lord is more and more known, and his books here more and more delighted in; and those men that have more than ordinary knowledge in human affairs, esteem him one of the most capable spirits of this age; and he is truly such.* Now his fame doth not decrease with days since, but rather increase. Divers of his works have been anciently and yet lately translated into other tongues, both learned and modern, by foreign pens. Several persons of quality, during his lordship's life, crossed the seas on purpose to gain an opportunity of seeing him and discoursing with him; whereof one carried his lordship's picture from head to foot [1] over with him into France, as a thing which he foresaw would be much desired there, that so they might enjoy the image of his person as well as the images of his brain, his books. Amongst the rest, Marquis Fiat, a French nobleman, who came ambassador into England, in the beginning of Queen Mary, wife to King Charles, was taken with an extraordinary desire of seeing him; for which he made way by a friend; and when he came to him, being then through weakness confined to his bed, the marquis saluted him with this high

[1] This picture was presented to him by Bacon himself, according to the Latin version.

expression, *That his lordship had been ever to him like the angels; of whom he had often heard, and read much of them in books, but he never saw them.* After which they contracted an intimate acquaintance, and the marquis did so much revere him, that besides his frequent visits, they wrote letters one to the other, under the titles and appellations of father and son. As for his many salutations by letters from foreign worthies devoted to learning, I forbear to mention them, because that is a thing common to other men of learning or note, together with him.

But yet, in this matter of his fame, I speak in the comparative only, and not in the exclusive. For his reputation is great in his own nation also, especially amongst those that are of a more acute and sharper judgment; which I will exemplify but with two testimonies and no more. The former, when his *History of King Henry the Seventh* was to come forth, it was delivered to the old Lord Brook, to be perused by him; who, when he had dispatched it, returned it to the author with this eulogy, *Commend me to my lord, and bid him take care to get good paper and ink, for the work is incomparable.* The other shall be that of Doctor Samuel Collins, late provost of King's College in Cambridge, a man of no vulgar wit, who affirmed unto me[1], *That when he had read the book of the Advancement of Learning, he found himself in a case to begin his studies anew, and that he had lost all the time of his studying before.*

It hath been desired, that something should be signified touching his diet, and the regimen of his health, of which, in regard of his universal insight into nature, he may perhaps be to some an example. For his diet, it was rather a plentiful and liberal diet, as his stomach would bear it, than a restrained; which he also commended in his book of the *History of Life and Death.* In his younger years he was much given to the finer and lighter sort of meats, as of fowls, and such like; but afterward, when he grew more judicious[2], he preferred the stronger meats, such as the shambles afforded, as those meats which bred the more firm and substantial juices of the body, and less *dissipable;* upon which he would often make his meal, though he had other meats upon the table. You may be sure he would not neglect that himself, which he so much extolled in his writings, and

[1] In the Latin version Rawley has thought it worth while to add that this may have been said playfully: *Sive festive sive serio.*

[2] More judicious (that is) by experience and observation: *experientiâ edoctus* is the expression in the Latin version.

that was the use of nitre; whereof he took in the quantity of about three grains in thin warm broth every morning, for thirty years together next before his death. And for physic, he did indeed live physically, but not miserably; for he took only a maceration of rhubarb [1], infused into a draught of white wine and beer mingled together for the space of half an hour, once in six or seven days, immediately before his meal (whether dinner or supper), that it might dry the body less; which (as he said) did carry away frequently the grosser humours of the body, and not diminish or carry away any of the spirits, as sweating doth. And this was no grievous thing to take. As for other physic, in an ordinary way (whatsoever hath been vulgarly spoken) he took not. His receipt for the gout, which did constantly ease him of his pain within two hours, is already set down in the end of the *Natural History*.

It may seem the moon had some principal place in the figure of his nativity: for the moon was never in her passion, or eclipsed [2], but he was surprised with a sudden fit of fainting; and that, though he observed not nor took any previous knowledge of the eclipse thereof; and as soon as the eclipse ceased, he was restored to his former strength again.

He died on the ninth day of April in the year 1626, in the early morning of the day then celebrated for our Saviour's resurrection, in the sixty-sixth year of his age, at the Earl of Arundel's house in Highgate, near London, to which place he casually repaired about a week before; God so ordaining that

[1] In the Latin version Rawley gives the quantity: *Rhabarbari sesquidrachmam.*

[2] Lord Campbell (who appears to have read Rawley's memoir only in the Latin, where the words are *quoties luna* defecit *sive eclipsin passa est*), supposing *defecit* to mean *waned*, discredits this statement, on the ground that "no instance is recorded of Bacon's having fainted in public, or put off the hearing of any cause on account of *the change of the moon*, or of any approaching eclipse, visible or invisible." And it is true that if *defectus lunæ* meant a change of the moon, or even a dark moon (which it might have meant well enough if the Romans had not chosen to appropriate the word to quite another meaning), the accident must have happened in public too often to pass unnoticed. But Rawley was too good a scholar to misapply so common a word in that way. He evidently speaks of eclipses only, and of eclipses visible at the place. Now it is not at all likely that lunar eclipses visible at Westminster would have coincided with important business in which Bacon was conspicuously engaged, often enough (even if he did faint every time) to establish a connexion between the two phenomena. Of course Rawley's statement is not sufficient to prove the reality of any such connexion; but there is no reason to suppose it an invention, and it may be fairly taken, I think, as evidence of the extreme delicacy of Bacon's temperament, and its sensibility to the skiey influences. That Bacon himself never alluded to this relation between himself and the moon is easily accounted for by supposing that he was not satisfied of the fact. He may have observed the coincidence, and mentioned it to Rawley; and Rawley (whose commonplace book proves that he had a taste for astrology) may have believed in the physical connexion, though Bacon himself did not.

he should die there of a gentle fever, accidentally accompanied with a great cold, whereby the defluxion of rheum fell so plentifully upon his breast, that he died by suffocation; and was buried in St. Michael's church at St. Albans; being the place designed for his burial by his last will and testament, both because the body of his mother was interred there, and because it was the only church then remaining within the precincts of old Verulam: where he hath a monument erected for him in white marble (by the care and gratitude of Sir Thomas Meautys, knight, formerly his lordship's secretary, afterwards clerk of the King's Honourable Privy Council under two kings); representing his full portraiture in the posture of studying, with an inscription composed by that accomplished gentleman and rare wit, Sir Henry Wotton.[1]

But howsoever his body was mortal, yet no doubt his memory and works will live, and will in all probability last as long as the world lasteth. In order to which I have endeavoured (after my poor ability) to do this honour to his lordship, by way of conducing to the same.

FINIS.

FRANCISCUS BACON, BARO DE VERULAM, S^t^. ALBANI VIC^mes^,
SEU NOTIORIBUS TITULIS
SCIENTIARUM LUMEN FACUNDIÆ LEX
SIC SEDEBAT.

QUI POSTQUAM OMNIA NATURALIS SAPIENTIÆ
ET CIVILIS ARCANA EVOLVISSET
NATURÆ DECRETUM EXPLEVIT
COMPOSITA SOLVANTUR
AN. DNI M.DC.XXVI.
ÆTAT^is^ LXVI.

TANTI VIRI
MEM.
THOMAS MEAUTUS
SUPERSTITIS CULTOR
DEFUNCTI ADMIRATOR
H. P.

THE

PHILOSOPHICAL WORKS

OF

FRANCIS BACON.

GENERAL PREFACE

TO

BACON'S PHILOSOPHICAL WORKS.

BY ROBERT LESLIE ELLIS.

(1.) Our knowledge of Bacon's method is much less complete than it is commonly supposed to be. Of the *Novum Organum*, which was to contain a complete statement of its nature and principles, we have only the first two books; and although in other parts of Bacon's writings, as for instance in the *Cogitata et Visa de Interpretatione Naturæ*, many of the ideas contained in these books recur in a less systematic form, we yet meet with but few indications of the nature of the subjects which were to have been discussed in the others. It seems not improbable that some parts of Bacon's system were never perfectly developed even in his own mind. However this may be, it is certain that an attempt to determine what his method, taken as a whole, was or would have been, must necessarily involve a conjectural or hypothetical element; and it is, I think, chiefly because this circumstance has not been sufficiently recognised, that the idea of Bacon's philosophy has generally speaking been but imperfectly apprehended.

(2.) Of the subjects which were to have occupied the remainder of the *Novum Organum* we learn something from a passage at the end of the second book.

"Nunc vero," it is said at the conclusion of the doctrine of prerogative instances, "ad adminicula et rectificationes inductionis, et deinceps ad concreta, et latentes processus, et latentes schematismos, et reliqua quæ aphorismo XXI ordine proposuimus, pergendum." On referring to the twenty-first aphorism we find a sort of table of contents of the whole work. "Dice-

mus itaque primo loco, de prærogativis instantiarum; secundo, de adminiculis inductionis; tertio, de rectificatione inductionis; quarto, de variatione inquisitionis pro naturâ subjecti; quinto, de prærogativis naturarum quatenus ad inquisitionem, sive de eo quod inquirendum est prius et posterius; sexto, de terminis inquisitionis, sive de synopsi omnium naturarum in universo; septimo, de deductione ad praxin, sive de eo quod est in ordine ad hominem; octavo, de parascevis ad inquisitionem; postremo autem, de scalâ ascensoriâ et descensoriâ axiomatum." Of these nine subjects the first is the only one with which we are at all accurately acquainted.

(3.) Bacon's method was essentially inductive. He rejected the use of syllogistic or deductive reasoning, except when practical applications were to be made of the conclusions, axiomata, to which the inquirer had been led by a systematic process of induction. "Logica quæ nunc habetur inutilis est ad inventionem scientiarum. . . . . Spes est una in inductione verâ."[1] It is to be observed that wherever Bacon speaks of an "ascending" process, he is to be understood to mean induction, of which it is the character to proceed from that which is *nobis notius* to that which is *notius simpliciter*. Contrariwise when he speaks of a descent, he always refers to the correlative process of deduction. Thus when in the *Partis secundæ Delineatio* he says, . . . "meminerint homines in inquisitione activâ necesse esse rem per scalam descensoriam (cujus usum in contemplativâ sustulimus) confici: omnis enim operatio in individuis versatur quæ infimo loco sunt,"—we are to understand that in Bacon's system deduction is only admissible in the inquisitio activa; that is, in practical applications of the results of induction. Similarly in the *Distributio Operis* he says, "Rejicimus syllogismum; neque id solùm quoad principia (ad quæ nec illi eam adhibent) sed etiam quoad propositiones medias." Everything was to be established by induction. "In constituendo autem axiomate forma inductionis alia quàm adhuc in usu fuit excogitanda est, eaque non ad principia tantùm (quæ vocant) probanda et invenienda, sed etiam ad axiomata minora, et media, denique omnia."[2]

(4.) It is necessary to determine the relation in which Bacon conceived his method to stand to ordinary induction. Both methods set out "a sensu et particularibus," and acquiesce "in

[1] Nov. Org. i. 11. and 14. [2] Nov. Org. i. 105.

maximè generalibus;"[1] but while ordinary induction proceeds "per enumerationem simplicem," by a mere enumeration of particular cases, "et precario concludit et periculo exponitur ab instantiâ contradictoriâ," the new method "naturam separare debet, per rejectiones et exclusiones debitas; et deinde post negativas tot quot sufficiunt super affirmativas concludere."[2] A form of induction was to be introduced, "quæ ex aliquibus generaliter concludat ita ut instantiam contradictoriam inveniri non posse demonstretur."[3] In strong contrast with this method stands "the induction which the logicians speak of," which "is utterly vicious and incompetent." . . . "For to conclude upon an enumeration of particulars, without instance contradictory, is no conclusion, but a conjecture." . . . "And this form, to say truth, is so gross, as it had not been possible for wits so subtile as have managed these things to have offered it to the world, but that they trusted to their theories and dogmaticals, and were imperious and scornful towards particulars."[4] We thus see what is meant by the phrase "quot sufficiunt" in the passage which has been cited from the *Novum Organum;* it means "as many as may suffice in order to the attainment of certainty," it being necessary to have a method of induction, "quæ experientiam solvat et separet, et per exclusiones et rejectiones debitas necessario concludat."[5] Absolute certainty is therefore one of the distinguishing characters of the Baconian induction. Another is that it renders all men equally capable, or nearly so, of attaining to the truth. "Nostra verò inveniendi scientias ea est ratio ut non multum ingeniorum acumini et robori relinquatur; sed quæ ingenia et intellectus ferè exæquet;"[6] and this is illustrated by the difficulty of describing a circle liberâ manu, whereas every one can do it with a pair of compasses. "Omninò similis est nostra ratio." The cause to which this peculiarity is owing, is sufficiently indicated by the illustration: the method "exæquat ingenia," "cùm omnia per certissimas regulas et demonstrationes transigat."

(5.) Absolute certainty, and a mechanical mode of procedure

[1] Nov. Org. i. 22. [2] Nov. Org. i. 105.

[3] Cogitata et Visa, § 18.

[4] Advancement of Learning. The corresponding passage in the De Augm. is in the 2nd chap. of the 5th book.

[5] Distrib. Operis, § 10.

[6] Nov. Org. i. 61., and comp. i. 122. Also the Inquisitio legitima de Motu, and Valerius Terminus, c. 19.

such that all men should be capable of employing it, are thus two great features of the Baconian method. His system can never be rightly understood if they are neglected, and any explanation of it which passes them over in silence leaves unexplained the principal difficulty which that system presents to us. But another difficulty takes the place of the one which is thus set aside. It becomes impossible to justify or to understand Bacon's assertion that his method was essentially new. "Nam nos," he says in the preface to the *Novum Organum*, "si profiteamur nos meliora afferre quam antiqui, eandem quam illi viam ingressi, nullâ verborum arte efficere possimus, quin inducatur quædam ingenii, vel excellentiæ, vel facultatis comparatio, sive contentio. . . . Verùm cùm per nos illud agatur, ut *alia omnino via* intellectui aperiatur illis intentata et incognita, commutata tota jam ratio est," &c. He elsewhere speaks of himself as being "in hâc re plane protopirus, et vestigia nullius sequutus."[1] Surely this language would be out of place, if the difference between him and those who had gone before him related merely to matters of detail; as, for instance, that his way of arranging the facts of observation was more convenient than theirs, and his way of applying an inductive process to them more systematic. And it need not be remarked that induction in itself was no novelty at all. The nature of the act of induction is as clearly stated by Aristotle as by any later writer. Bacon's design was surely much larger than it would thus appear to have been. Whoever considers his writings without reference to their place in the history of philosophy will I think be convinced that he aimed at giving a wholly new method,—a method universally applicable, and in all cases infallible. By this method, all the knowledge which the human mind is capable of receiving might be attained, and attained without unnecessary labour. Men were no longer to wander from the truth in helpless uncertainty. The publication of this new doctrine was the *Temporis Partus Masculus;* it was as the rising of a new sun, before which "the borrowed beams of moon and stars" were to fade away and disappear.[2]

(6.) That the wide distinction which Bacon conceived to exist between his own method and any which had previously

[1] Nov. Org. i. 113.

[2] See, for instance, the *Præfatio Generalis*, where Bacon compares his method to the mariner's compass, until the discovery of which no wide sea could be crossed; an image probably connected with his favourite device of a ship passing through the pillars of Hercules, with the motto "Plus ultra."

been known has often been but slightly noticed by those who have spoken of his philosophy, arises probably from a wish to recognise in the history of the scientific discoveries of the last two centuries the fulfilment of his hopes and prophecies. One of his early disciples however, who wrote before the scientific movement which commenced about Bacon's time had assumed a definite form and character — I mean Dr. Hooke — has explicitly adopted those portions of Bacon's doctrine which have seemingly been as a stumbling-block to his later followers. In Hooke's *General Scheme or Idea of the Present State of Natural Philosophy*[1], which is in many respects the best commentary on Bacon, we find it asserted that in the pursuit of knowledge, the intellect "is continually to be assisted by some method or engine which shall be as a guide to regulate its actions, so as that it shall not be able to act amiss. Of this engine no man except the incomparable Verulam hath had any thoughts, and he indeed hath promoted it to a very good pitch." Something however still remained to be added to this engine or art of invention, to which Hooke gives the name of philosophical algebra. He goes on to say, "I cannot doubt but that if this art be well prosecuted and made use of, an ordinary capacity with industry will be able to do very much more than has yet been done, and to show that even physical and natural inquiries as well as mathematical and geometrical will be capable also of demonstration; so that henceforward the business of invention will not be so much the effect of acute wit, as of a serious and industrious prosecution."[2] Here the absolute novelty of Bacon's method, its demonstrative character, and its power of reducing all minds to nearly the same level, are distinctly recognised.

(7.) Before we examine the method of which Bacon proposed to make use, it is necessary to determine the nature of the problems to which it was, for the most part at least, to be applied. In other words, we must endeavour to determine the idea which he had formed of the nature of science.

Throughout his writings, science and power are spoken of as correlative — "in idem coincidunt;" and the reason of this is that Bacon always assumed that the knowledge of the cause would in almost all cases enable us to produce the observed effect. We shall see hereafter how this assumption connected

[1] Published posthumously in 1705.

[2] Present State of Nat. Phil. pp. 6, 7.

itself with the whole spirit of his philosophy. I mention it now because it presents itself in the passage in which Bacon's idea of the nature of science is most distinctly stated. "Super datum corpus novam naturam, sive novas naturas, generare et superinducere, opus et intentio est humanæ potentiæ. Datæ autem naturæ formam, sive differentiam veram, sive naturam naturantem, sive fontem emanationis, (ista enim vocabula habemus quæ ad indicationem rei proxime accedunt) invenire, opus et intentio est humanæ scientiæ." This passage, with which the second book of the *Novum Organum* commences, requires to be considered in detail.

In the first place it is to be remarked, that natura signifies "abstract quality," — it is used by Bacon in antithesis with corpus or "concrete body." Thus the passage we have quoted amounts to this, that the scope and end of human power is to give new qualities to bodies, while the scope and end of human knowledge is to ascertain the formal cause of all the qualities of which bodies are possessed.

Throughout Bacon's philosophy, the necessity of making abstract qualities (naturæ) the principal object of our inquiries is frequently insisted on. He who studies the concrete and neglects the abstract cannot be called an interpreter of nature. Such was Bacon's judgment when, apparently at an early period of his life, he wrote the *Temporis Partus Masculus*[1]; and in the *Novum Organum* he has expressed an equivalent opinion: "quòd iste modus operandi, (qui naturas intuetur simplices licet in corpore concreto) procedat ex iis quæ in naturâ sunt constantia et æterna et catholica, et latas præbeat potentiæ humanæ vias."[2] Quite in accordance with this passage is a longer one in the *Advancement of Learning*, which I shall quote in extenso, as it is exceedingly important. "The forms of substances, I say, as they are now by compounding and transplanting multiplied, are so perplexed as they are not to be inquired; no more than it were either possible or to purpose to seek in gross the forms of those sounds which make words, which by composition and transposition of letters are infinite. But on the other side to inquire the form of those sounds or voices which make

[1] Mr. Ellis alludes, I think, to the *De Interpretatione Naturæ Sententiæ* XII., which M. Bouillet prints as part of the *Temporis Partus Masculus*. My reasons for differing with M. Bouillet on this point, and placing it by itself, and assigning it a later date, will be found in a note to Mr. Ellis's Preface to the *Novum Organum*.—*J. S.*

[2] Nov. Org. ii. 5.

simple letters is easily comprehensible, and being known induceth and manifesteth the forms of all words which consist and are compounded of them. In the same manner, to inquire the form of a lion, of an oak, of gold — nay of water, of air — is a vain pursuit; but to inquire the forms of sense, of voluntary motion, of vegetation, of colours, of gravity and levity, of density, of tenuity, of heat, of cold, and all other natures and qualities which like an alphabet are not many, and of which the essences upheld by matter of all creatures do consist, — to inquire, I say, the true forms of these, is that part of metaphysique which we now define of." And a little farther on we are told that it is the prerogative of metaphysique to consider "the simple forms or difference of things" (that is to say, the forms of simple natures), "which are few in number, and the degrees and coordinations whereof make all this variety."

We see from these passages why the study of simple natures is so important — namely because they are comparatively speaking few in number, and because, notwithstanding this, a knowledge of their essence would enable us, at least in theory, to solve every problem which the universe can present to us.

As an illustration of the doctrine of simple natures, we may take a passage which occurs in the *Silva Silvarum*. "Gold," it is there said, "has these natures: greatness of weight, closeness of parts, fixation, pliantness or softness, immunity from rust, colour or tincture of yellow. Therefore the sure way, though most about, to make gold, is to know the causes of the several natures before rehearsed, and the axioms concerning the same. For if a man can make a metal that hath all these properties, let men dispute whether it be gold or no."[1]

Of these simple natures Bacon has given a list in the third book of the *De Augmentis*. They are divided into two classes: schematisms of matter, and simple motions. To the former belong the abstract qualities, dense, rare, heavy, light, &c., of which thirty-nine are enumerated, the list being concluded with a remark that it need not be carried farther, "neque ultra rem extendimus." The simple motions — and it will be observed that the word "motion" is used in a wide and vague sense — are the motus antitypiæ, which secures the impenetrability of matter; the motus nexûs, commonly called the motus ex fugâ vacui, &c.;

[1] Compare Nov. Org. ii. 5.

and of these motions fourteen are mentioned. This list however does not profess to be complete, and accordingly in the *Novum Organum* (ii. 48.) another list of simple motions is given, in which nineteen species are recognised.

The view of which we have now been speaking—namely, that it is possible to reduce all the phenomena of the universe to combinations of a limited number of simple elements — is the central point of Bacon's whole system. It serves, as we shall see, to explain the peculiarities of the method which he proposed.

(8.) In what sense did Bacon use the word "Form"? This is the next question which, in considering the account which he has given of the nature of science, it is necessary to examine. I am, for reasons which will be hereafter mentioned, much disposed to believe that the doctrine of Forms is in some sort an extraneous part of Bacon's system. His peculiar method may be stated independently of this doctrine, and he has himself so stated it in one of his earlier tracts, namely the *Valerius Terminus*. It is at any rate certain, that in using the word "Form" he did not intend to adopt the scholastic mode of employing it. He was much in the habit of giving to words already in use a new signification. "To me," he remarks in the *Advancement of Learning*, "it seemeth best to keep way with antiquity usque ad aras, and therefore to retain the ancient terms, though I sometimes alter the uses and definitions." And thus though he has spoken of the scholastic forms as figments of the human mind [1], he was nevertheless willing to employ the word "Form" in a modified sense, "præsertim quum hoc vocabulum invaluerit, et familiariter occurrat." [2] He has however distinctly stated that in speaking of Forms, he is not to be understood to speak of the Forms "quibus hominum contemplationes et cogitationes hactenus assueverunt." [3]

As Bacon uses the word in his own sense, we must endeavour to interpret the passages in which it occurs by means of what he has himself said of it; and this may I think be satisfactorily accomplished.

We may begin by remarking that in Bacon's system, as in those of many others, the relation of substance and attribute is virtually the same as the relation of cause and effect. The substance is conceived of as the causa immanens of its attri-

[1] Nov. Org. i. 51. [2] Nov. Org. ii. 2. [3] Nov. Org. ii. 17.

butes[1], or in other words it is the formal cause of the qualities which are referred to it. As there is a difference between the properties of different substances, there must be a corresponding difference between the substances themselves. But in the first state of the views of which we are speaking this latter difference is altogether unimaginable: "distincte quidem intelligi potest, sed non explicari imaginabiliter."[2] It belongs not to natural philosophy, but to metaphysics.

These views however admit of an essential modification. If we divide the qualities of bodies into two classes, and ascribe those of the former class to substance as its essential attributes, while we look on those of the latter as connected with substance by the relation of cause and effect—that is, if we recognise the distinction of primary and secondary qualities—the state of the question is changed. It now becomes possible to give a definite answer to the question, Wherein does the difference between different substances, corresponding to the difference between their sensible qualities, consist?

The answer to this question of course involves a reference to the qualities which have been recognised as primary; and we are thus led to the principle that in the sciences which relate to the secondary qualities of bodies the primary ones are to be regarded as the causes of the secondary.[3]

This division of the qualities of bodies into two classes is the point of transition from the metaphysical view from which we set out to that of ordinary physical science. And this transition Bacon had made, though not perhaps with a perfect consciousness of having done so. Thus he has repeatedly denied the truth of the scholastic doctrine that Forms are incognoscible because supra-sensible[4]; and the reason of this is clearly that his conception of the nature of Forms relates merely to the primary qualities of bodies. For instance, the Form of heat is a kind of local motion of the particles of which bodies are composed[5], and that of whiteness a mode of arrangement among those particles.[6] This peculiar motion or arrangement corresponds to and engenders heat or whiteness, and this in every case in which those qualities exist. The statement of the distinguishing character

[1] See Zimmerman's Essay on the Monadology of Leibnitz, p. 86. (Vienna, 1807).
[2] Leibnitz, De ipsâ Naturâ. [3] Whewell, Phil. Ind. Science, [book iv. ch. i]
[4] See Scaliger, Exercit. in Cardan.
[5] [Nov. Org. ii. 20.] [6] [Valerius Terminus, ii. 1.]

of the motion or arrangement, or of whatever else may be the Form of a given phenomenon, takes the shape of a law; it is the law in fulfilling which any substance determines the existence of the quality in question. It is for this reason that Bacon sometimes calls the Form a law; he has done this particularly in a passage which will be mentioned a little farther on.

With the view which has now been stated, we shall I think be able to understand every passage in which Bacon speaks of Forms; — remembering however that as he has not traced a boundary line between primary and secondary qualities, we can only say in general terms that his doctrine of Forms is founded upon the theory that certain qualities of bodies are merely subjective and phenomenal, and are to be regarded as necessarily resulting from others which belong to substance as its essential attributes. In the passage from which we set out[1], the Form is spoken of as vera differentia, the true or essential difference, — as natura naturans — and as the fons emanationis. The first of these expressions refers to the theory of definition by genus and difference. The difference is that which gives the thing defined its specific character. If it be founded on an accidental circumstance, the definition, though not incorrect if the accident be an inseparable one, will nevertheless not express the true and essential character of its subject; contrariwise, if it involve a statement of the formal cause of the thing defined.

The second of these phrases is now scarcely used, except in connexion with the philosophy of Spinoza. It had however been employed by some of the scholastic writers.[2] It is always antithetical to natura naturata, and in the passage before us serves not inaptly to express the relation in which the Form stands to the phenomenal nature which results from it.

The phrase fons emanationis does not seem to require any explanation. It belongs to the kind of philosophical language which attempts, more or less successfully, to give clearness of conception by means of metaphor. It is unnecessary to remark how much this is the case in the later development of scholasticism.

A little farther on in the second book of the *Novum Organum* than the passage we have been considering, — namely

[1] [Nov. Org. ii. 1.]

[2] See Vossius De Vitiis Serm. in voce Naturare; and Castanæus, Distinctiones in voc. Natura.

in the thirteenth aphorism,—Bacon asserts that the "forma rei" is "ipsissima res," and that the thing and its Form differ only as "apparens et existens, aut exterius et interius, aut in ordine ad hominem et in ordine ad universum." Here the subjective and phenomenal character of the qualities whose form is to be determined is distinctly and strongly indicated.

The principal passage in which the Form is spoken of as a law occurs in the second aphorism of the same book. It is there said that, although in nature nothing really exists (vere existat) except "corpora individua edentia actus puros individuos ex lege," yet that in doctrine this law is of fundamental importance, and that it and its clauses (paragraphi) are what he means when he speaks of Forms.

In denying the real existence of anything beside individual substances, Bacon opposes himself to the scholastic realism; in speaking of these substances as "edentia actus," he asserts the doctrine of the essential activity of substance; by adding the epithet "puros" he separates what Aristotle termed ἐντελέχειαι from mere motions or κινήσεις, thereby by implication denying the objective reality of the latter; and, lastly, by using the word "individuos," he implies that though in contemplation and doctrine the form law of the substance (that is, the substantial form) is resoluble into the forms of the simple natures which belong to it, as into clauses, yet that this analysis is conceptual only, and not real.

It will be observed that the two modes in which Bacon speaks of the Form, namely as ipsissima res and as a law, differ only, though they cannot be reconciled, as two aspects of the same object.

Thus much of the character of the Baconian Form. That it is after all only a physical conception appears sufficiently from the examples already mentioned, and from the fact of its being made the most important part of the subject-matter of the natural sciences.

The investigation of the Forms of natures or abstract qualities is the principal object of the Baconian method of induction. It is true that Bacon, although he gives the first place to investigations of this nature, does not altogether omit to mention as a subordinate part of science, the study of concrete substances. The first aphorism of the second book of the *Novum Organum* sufficiently explains the relation in which, as he conceived, the

abstract and the concrete, considered as objects of science, ought to stand to one another. This relation corresponds to that which in the *De Augmentis* [iii. 4.], he had sought to establish between Physique and Metaphysique, and which he has there expressed by saying that the latter was to be conversant with the formal and final causes, while the former was to be confined to the efficient cause and to the material. It may be asked, and the question is not easily answered, Of what use the study of concrete bodies was in Bacon's system to be, seeing that the knowledge of the Forms of simple natures would, in effect, include all that can be known of the outward world? I believe that, if Bacon's recognition of physique as a distinct branch of science which was to be studied apart from metaphysique or the doctrine of Forms, can be explained except on historical grounds,—that is, except by saying that it was derived from the quadripartite division of causes given by Aristotle[1],—the explanation is merely this, that he believed that the study of concrete bodies would at least at first be pursued more hopefully and more successfully than the abstract investigations to which he gave the first rank.[2]

However this may be, it seems certain that Bacon's method, as it is stated in the *Novum Organum*, is primarily applicable to the investigation of Forms, and that when other applications were made of it, it was to be modified in a manner which is nowhere distinctly explained. All in fact that we know of these modifications results from comparing two passages which have been already quoted[3]; namely the two lists in which Bacon enumerates the subjects to be treated of in the latter books of the *Novum Organum*.

It will be observed that in one of these lists the subject of concrete bodies corresponds to the "variation of the investigation according to the nature of the subject" in the other, and from this it seems to follow that Bacon looked on his method of investigating Forms as the fundamental type of the inductive process, from which in its other applications it deviated more or less according to the necessity of the case. This being understood, we may proceed to speak of the inductive method itself.

(9.) The practical criterium of a Form by means of which it is to

[1] For an explanation of which, see note on De Augmentis, iii. 4.—*J. S.*
[2] See, in illustration of this, Nov. Org. ii. 5.
[3] Vide supra, § 2.

be investigated and recognised, reduces itself to this,—that the form nature and the phenomenal nature (so to modify, for the sake of distinctness, Bacon's phraseology) must constantly be either both present or both absent; and moreover that when either increases or decreases, the other must do so too.[1] Setting aside the vagueness of the second condition, it is to be observed that there is nothing in this criterium to decide which of two concomitant natures is the Form of the other. It is true that in one place Bacon requires the form nature, beside being convertible with the given one, to be also a limitation of a more general nature. His words are "natura alia quæ sit cum naturâ datâ convertibilis et tamen sit limitatio naturæ notioris instar generis veri."[2] Of this the meaning will easily be apprehended if we refer to the case of heat, of which the form is said to be a kind of motion — motion being here the natura notior, the more general natura, of which heat is a specific limitation; for wherever heat is present there also is motion, but not vice versâ. Still the difficulty recurs, that there is nothing in the practical operation of Bacon's method which can serve to determine whether this subsidiary condition is fulfilled; nor is the condition itself altogether free from vagueness.

To each of the three points of that which I have called the practical criterium of the Form corresponds one of the three tables with which the investigation commences. The first is the table "essentiæ et præsentiæ," and contains all known instances in which the given nature is present. The second is the table of declination or absence in like case (declinationis sive absentiæ in proximo), and contains instances which respectively correspond to those of the first table, but in which, notwithstanding this correspondence, the given nature is absent. The third is the table of degrees or comparison (tabula graduum sive tabula comparativæ), in which the instances of the given nature are arranged according to the degree in which it is manifested in each.

It is easy to see the connexion between these tables, which are collectively called tables of appearance, "comparentiæ," and the criterium. For, let any instance in which the given nature is present (as the sun in the case of heat, or froth in the case of whiteness) be resolved into the natures by the aggregation of which our idea of it is constituted; one of these natures is

[1] Nov. Org. ii. 4, 13, 16. [2] Nov. Org. ii. 4.

necessarily the form nature, since this is always to be present when the given nature is. Similarly, the second table corresponds to the condition that the Form and the given nature are to be absent together, and the third to that of their increasing or decreasing together.

After the formation of these tables, how is the process of induction to be carried into effect? By a method of exclusion. This method is the essential point of the whole matter, and it will be well to show how much importance Bacon attached to it.

In the first place, wherever he speaks of ordinary induction and of his own method he always remarks that the former proceeds " per enumerationem simplicem," that is, by a mere enumeration of particular cases, while the latter makes use of exclusions and rejections. This is the fundamental character of his method, and it is from this that the circumstances which distinguish it from ordinary induction necessarily follow. Moreover we are told that whatever may be the privileges of higher intelligences, man can only in one way advance to a knowledge of Forms: he is absolutely obliged to proceed at first by negatives, and then only can arrive at an affirmative when the process of exclusion has been completed (post omnimodam exclusionem).[1] The same doctrine is taught in the exposition of the fable of Cupid. For according to some of the mythographi Cupid comes forth from an egg whereon Night had brooded. Now Cupid is the type of the primal nature of things; and what is said of the egg hatched by Night refers, Bacon affirms, most aptly to the demonstrations whereby our knowledge of him is obtained; for knowledge obtained by exclusions and negatives results, so to speak, from darkness and from night. We see, I think, from this allegorical fancy, as clearly as from any single passage in his writings, how firmly fixed in his mind was the idea of the importance, or rather of the necessity, of using a method of exclusion.

It is not difficult, on Bacon's fundamental hypothesis, to perceive why this method is of paramount importance. For assuming that each instance in which the given nature is presented to us can be resolved into (and mentally replaced by) a congeries of elementary natures, and that this analysis is not merely sub-

[1] Nov. Org. ii. 15.

jective or logical, but deals, so to speak, with the very essence of its subject-matter, it follows that to determine the form nature among the aggregate of simple natures which we thus obtain, nothing more is requisite than the rejection of all foreign and unessential elements. We reject every nature which is not present in every affirmative instance, or which is present in any negative one, or which manifests itself in a greater degree when the given nature manifests itself in a less, or vice versâ. And this process when carried far enough will of necessity lead us to the truth; and meanwhile every step we take is known to be an approximation towards it. Ordinary induction is a tentative process, because we chase our quarry over an open country; here it is confined within definite limits, and these limits become as we advance continually narrower and narrower.

From the point of view at which we have now arrived, we perceive why Bacon ascribed to his method the characters by which, as we have seen, he conceived that it was distinguished from any which had previously been proposed. When the process of exclusion has been completely performed, only the form nature will remain; it will be, so to speak, the sole survivor of all the natures combined with which the given nature was at first presented to us. There can therefore be no doubt as to our result, nor any possibility of confounding the Form with any other of these natures. This is what Bacon expresses, when he says that the first part of the true inductive process is the exclusion of every nature which is not found in each instance where the given one is present, or is found where it is not present, or is found to increase where the given nature decreases, or vice versâ. And then, he goes on to say, when this exclusion has been duly performed, there will in the second part of the process remain, as at the bottom, all mere opinions having been dissipated (abeuntibus in fumum opinionibus volatilibus), the affirmative Form, which will be solid and true and well defined.[1] The exclusion of error will necessarily lead to truth.

Again, this method of exclusion requires only an attentive consideration of each "instantia," in order first to analyse it into its simple natures, and secondly to see which of the latter

[1] Nov. Org. ii. 16.

are to be excluded—processes which require no higher faculties than ordinary acuteness and patient diligence. There is clearly no room in this mechanical procedure for the display of subtlety or of inventive genius.

Bacon's method therefore leads to certainty, and may be employed with nearly equal success by all men who are equally diligent.

In considering the only example which we have of its practical operation, namely the investigation of the form of heat[1], it is well to remark a circumstance which tends to conceal its real nature. After the three tables of Comparentia, Bacon proceeds to the Exclusiva, and concludes by saying that the process of exclusion cannot at the outset (sub initiis) be perfectly performed. He therefore proposes to go on to provide additional assistance for the mind of man. These are manifestly to be subsidiary to the method of exclusions; they are to remove the obstacles which make the Exclusiva defective and inconclusive. But in the meanwhile, and as it were provisionally, the intellect may be permitted to attempt an affirmative determination on the subject before it: "Quod genus tentamenti Permissionem Intellectûs, sive Interpretationem inchoatam, sive Vindemiationem primam, appellare consuevimus." The phrase Permissio Intellectûs sufficiently indicates that in this process the mind is suffered to follow the course most natural to it; it is relieved from the restraints hitherto imposed on it, and reverts to its usual state. In this Vindemiatio we accordingly find no reference to the method of exclusion: it rests immediately on the three tables of Comparentia; and though of course it does not contradict the results of the Exclusiva, yet on the other hand it is not derived from them. If we lose sight of the real nature of this part of the investigation, which is merely introduced by the way "because truth is more easily extricated from error than from confusion," we also lose sight of the scope and purport of the whole method. All that Bacon proposes henceforth to do is to perfect the Exclusiva; the Vindemiatio prima, though it is the closing member of the example which Bacon makes use of, is not to be taken as the type of the final conclusion of any investigation which he would recognise as just and legitimate. It is only a parenthesis in

[1] Nov. Org. ii. 11—20.

the general method, whereas the Exclusiva, given in the eighteenth aphorism of the second book, is a type or paradigm of the process on which every true induction (inductio vera) must in all cases depend.

It may be well to remark that in this example of the process of exclusion, the table of degrees is not made use of.

Bacon, as we have seen, admits that the Exclusiva must at first be in some measure imperfect; for the Exclusiva, being the rejection of simple natures, cannot be satisfactory unless our notions of these natures are just and accurate, whereas some of those which occur in his example of the process of rejection are ill-defined and vague.[1] In order to the completion of his method, it is necessary to remove this defect. A subsidiary method is required, of which the object is the formation of scientific conceptions. To this method also Bacon gives the name of induction; and it is remarkable that induction is mentioned for the first time in the *Novum Organum* in a passage which relates not to axioms but to conceptions.[2] Bacon's induction therefore is not a mere ἐπαγωγή, it is also a method of definition; but of the manner in which systematic induction is to be employed in the formation of conceptions we learn nothing from any part of his writings. And by this circumstance our knowledge of his method is rendered imperfect and unsatisfactory. We may perhaps be permitted to believe that so far as relates to the subject of which we are now speaking, Bacon never, even in idea, completed the method which he proposed. For of all parts of the process of scientific discovery, the formation of conceptions is the one with respect to which it is the most difficult to lay down general rules. The process of establishing axioms Bacon had succeeded, at least apparently, in reducing to the semblance of a mechanical operation; that of the formation of conceptions does not admit of any similar reduction. Yet these two processes are in Bacon's system of co-ordinate importance. All commonly received general scientific conceptions Bacon condemns as utterly worthless.[3] A complete change is, therefore, required; yet of the way in which induction is to be employed in order to produce this change he has said nothing.

[1] Nov. Org. ii. 19.; and compare i. 15., which shows the necessity of a complete reform.

[2] Nov. Org. i. 14., and comp. i. 18.

[3] Nov. Org. i. 15, 16.

This omission is doubtless connected with the kind of realism which runs through Bacon's system, and which renders it practically useless. For that his method is impracticable cannot I think be denied, if we reflect not only that it never has produced any result, but also that the process by which scientific truths have been established cannot be so presented as even to appear to be in accordance with it. In all cases this process involves an element to which nothing corresponds in the tables of comparence and exclusion; namely the application to the facts of observation of a principle of arrangement, an idea, existing in the mind of the discoverer antecedently to the act of induction. It may be said that this idea is precisely one of the naturæ into which the facts of observation ought in Bacon's system to be analysed. And this is in one sense true; but it must be added that this analysis, if it be thought right so to call it, is of the essence of the discovery which results from it. To take for granted that it has already been effected is simply a petitio principii. In most cases the mere act of induction follows as a matter of course as soon as the appropriate idea has been introduced. If, for instance, we resolve Kepler's discovery that Mars moves in an ellipse into its constituent elements, we perceive that the whole difficulty is antecedent to the act of induction. It consists in bringing the idea of motion in an ellipse into connexion with the facts of observation; that is, in showing that an ellipse may be drawn through all the observed places of the planet. The mere act of induction, the ἐπαγωγή, is perfectly obvious. If all the observed places lie on an ellipse of which the sun is the focus, then every position which the planet successively occupies does so too. This inference, which is so obvious that it must have passed through the mind of the discoverer almost unconsciously, is an instance of induction "per enumerationem simplicem;" of which kind of induction Bacon, as we have seen, has said that it is utterly vicious and incompetent.

The word realism may perhaps require some explanation. I mean by it the opinion, which Bacon undoubtedly entertained, that for the purposes of investigation, the objects of our thoughts may be regarded as an assemblage of abstract conceptions, so that these conceptions not only correspond to realities, which is of course necessary in order to their having any value, but may also be said adequately to represent them. In his view of the

subject, ideas or conceptions (notiones) reside in some sort in the objects from which we derive them; and it is necessary, in order that the work of induction may be successfully accomplished, that the process by which they are derived should be carefully and systematically performed. But he had not perceived that which now at least can scarcely be doubted of, that the progress of science continually requires the formation of new conceptions whereby new principles of arrangement are introduced among the results which had previously been obtained, and that from the necessary imperfection of human knowledge our conceptions never, so to speak, exhaust the essence of the realities by which they are suggested. The notion of an alphabet of the universe, of which Bacon has spoken more than once, must therefore be given up; it could at best be only an alphabet of the present state of knowledge. And similarly of the analysis into abstract natures on which the process of exclusion, as we have seen, depends. No such analysis can be used in the manner which Bacon prescribes to us; for every advance in knowledge presupposes the introduction of a new conception, by which the previously existing analysis is rendered incomplete, and therefore erroneous.

We have now, I think, succeeded in tracing the cause both of the peculiarities of Bacon's method, and of its practical inutility. Some additional information may be derived from an examination of the variations with which it is presented in different parts of his writings;—less however than if we could arrange his smaller works in chronological order. Nevertheless two results, not without their value, may be thus obtained; the one, that it appears probable that Bacon came gradually to see more of the difficulties which beset the practical application of his method; and the other, that the doctrine of Forms is in reality an extraneous part of his philosophy.

(10.) In the earliest work in which the new method of induction is proposed, namely, the English tract entitled *Valerius Terminus*, no mention is made of the necessity of correcting commonly received notions of simple natures. The inductive method is therefore presented in its simplest form, unembarrassed with that which constitutes its principal difficulty. But when we advance from *Valerius Terminus* to the *Partis secundæ Delineatio et Argumentum*, which is clearly of a later date, we find that Bacon has become aware of the neces-

sity of having some scientific method for the due construction of abstract conceptions. It is there said that the "pars informans," that is, the description of the new method, will be divided into three parts — the ministration to the senses, the ministration to the memory, and the ministration to the reason. In the first of these, three things are to be taught; and of these three the first is how to construct and elicit from facts a duly formed abstract conception (bona notio); the second is how the senses may be assisted; and the third, how to form a satisfactory collection of facts. He then proposes to go on to the other two ministrations.

Thus the construction of conceptions would have formed the first part of the then designed *Novum Organum;* and it would seem that this arrangement was not followed when the *Novum Organum* was actually written, because in the meantime Bacon had seen that this part of the work involved greater difficulties than he had at first supposed. For the general division into "ministrationes" is preserved in the *Novum Organum*[1], though it has there become less prominent than in the tract of which we have been speaking. In the ministration to the senses, as it is mentioned in the later work, nothing is expressly included but a good and sufficient natural and experimental historia; the theory of the formation of conceptions has altogether disappeared, and both this ministration and that to the memory are postponed to the last of the three, which contains the theory of the inductive process itself. We must set out, Bacon says, from the conclusion, and proceed in a retrograde order to the other parts of the subject. He now seems to have perceived that the theory of the formation of conceptions and that of the establishment of axioms are so intertwined together, that the one cannot be presented independently of the other, although in practice his method absolutely requires these two processes to be carried on separately. His view now is, that at first axioms must be established by means of the commonly received conceptions, and that subsequently these conceptions must themselves be rectified by means of the ulterior aids to the mind, the fortiora auxilia in usum intellectûs, of which he has spoken in the nineteenth aphorism of the second book. But these fortiora auxilia were never given, so that the difficulty which

[1] Nov. Org. ii. 10.

Bacon had once proposed to overcome at the outset of his undertaking remained to the last unconquered. The doctrine of the *Novum Organum* (that we must first employ commonly received notions, and afterwards correct them) is expressly laid down in the *De Interpretatione Naturæ Sententiæ Duodecim.*[1] Of this however the date is uncertain.

It is clear that while any uncertainty remains as to the value of the conceptions (notiones) employed in the process of exclusion, the claim to absolute immunity from error which Bacon has made on behalf of his general method, must be more or less modified; and of this he seems to have been aware when he wrote the second book of the *Novum Organum.*[2]

(11.) Thus much of the theory of the formation of conceptions. With regard to the doctrine of Forms, it is in the first place to be observed that it is not mentioned as a part of Bacon's system, either in *Valerius Terminus* or in the *Partis secundæ Delineatio*, or in the *De Interpretatione Naturæ Sententiæ Duodecim*, although in the two last-named tracts the definition of science which is found at the outset of the second book of the *Novum Organum* is in substance repeated. This definition, as we have seen, makes the discovery of Forms the aim and end of science; but in both cases the word *form* is replaced by *causes.* It is however to be admitted that in the *Advancement of Learning*, published in 1605, Forms are spoken of as one of the subjects of Metaphysique. Their not being mentioned except ex obliquo in *Valerius Terminus* is more remarkable, because Bacon has there given a distinct name to the process which he afterwards called the discovery of the Form. He calls it the freeing of a direction, and remarks that it is not much other matter than that which in the received philosophies is termed the Form or formal cause. Forms are thus mentioned historically, but in the dogmatic statement of his own view they are not introduced at all.[3]

The essential character of Bacon's philosophy, namely the analysis of the concrete into the abstract, is nowhere more prominent than in *Valerius Terminus.* It is there said "that every particular that worketh any effect is a thing compounded more or less of diverse single natures, more manifest and more obscure, and that it appeareth not to whether (which) of the

[1] Vide § viii. of this tract. [2] Nov. Org. ii. 19.

[3] I refer to my preface to *Valerius Terminus* for an illustration of some of the difficulties of this very obscure tract.

natures the effect is to be ascribed."[1] Of course the great problem is to decide this question, and the method of solving it is called "the freeing of a direction." In explanation of this name, it is to be observed that in *Valerius Terminus* the practical point of view predominates. Every instance in which a given nature is produced is regarded as a *direction* for its artificial production. If air and water are mingled together, as in snow, foam, &c., whiteness is the result. This then is a direction for the production of whiteness, since we have only to mingle air and water together in order to produce it. But whiteness may be produced in other ways, and the direction is therefore not free. We proceed gradually to free it by rejecting, by means of other instances, the circumstances of this which are unessential: a process which is the exact counterpart of the Exclusiva of the *Novum Organum*. The instance I have given is Bacon's, who developes it at some length.

Here then we have Bacon's method treated entirely from a practical point of view. This circumstance is worthy of notice because it serves to explain why Bacon always assumes that the knowledge of Forms would greatly increase our command over nature, that it "would enfranchise the power of man unto the greatest possibility of works and effects." It has been asked what reason Bacon had for this assumption. "Whosoever knoweth any Form," he has said in the *Advancement*, "knoweth the utmost possibility of superinducing that nature upon any variety of nature." Beyond question, the problem of superinducing the nature is reduced to the problem of superinducing the Form; but what reason have we for supposing that the one is more easy of solution than the other? If we knew the Form of malleability, that is, the conditions which the intimate constitution of a body must fulfil in order that it may be malleable, does it follow that we could make glass so? So far as these questions admit of an answer, *Valerius Terminus* appears to suggest it. Bacon connected the doctrine of Forms with practical operations, because this doctrine, so to speak, represented to him his original notion of the freeing of a direction, which, as the phrase itself implies, had altogether a practical significance.

Even in the *Novum Organum* the definition of the Form is

[1] Val. Ter. c. 17.

made to correspond with the præceptum operandi, or practical direction.[1] The latter is to be "certum, liberum, et disponens sive in ordine ad actionem." Now a direction to produce the Form as a means of producing the given nature is certain, because the presence of the Form necessarily determines that of the nature. It is free, because it requires only that to be done which is necessary, since the nature can never be present unless its Form is so too. Thus far the agreement between the practical and the scientific view is satisfactory. But to the third property which the practical direction is to possess, namely its being in ordine ad actionem, or such as to facilitate the production of the proposed result, corresponds the condition that the Form is to be "the limitation of a more general nature;" that is to say, the Form presents itself as a limitation of something more general than the given nature, and as determining, not merely logically but also causatively, the existence of the latter. At this point the divergence between the practical and the scientific view becomes manifest; practical operations do not, generally speaking, present to us anything analogous to the limitation here spoken of, and there is no reason to suppose that it is easier to see how this limitation is to be introduced than to see how the original problem, the *ἐξ ἀρχῆς προκείμενον*, may be solved. But this divergence seems to show that the two views are in their origin heterogeneous; that the one contains the fundamental idea of Bacon's method, while the other represents the historical element of his philosophy. We shall however hereafter have occasion to suggest considerations which may seem to modify this conclusion.

(12.) In a survey of Bacon's method it is not necessary to say much of the doctrine of prerogative instances, though it occupies the greater part of the second book of the *Novum Organum*. It belongs to the unfinished part of that work; at least it is probable that its practical utility would have been explained when Bacon came to speak of the Adminicula Inductionis.

Twenty-seven kinds of instances are enumerated, which are said to excel ordinary instances either in their practical or their theoretical usefulness. To the word *instance* Bacon gives a wide range of signification. It corresponds more nearly to

[1] Nov. Org. ii. 4., which is the best comment on the dictum, Knowledge is power.

observation than to any other which is used in modern scientific language.

Of some classes of these instances collections are to be made for their own sake, and independently of any investigation into particular natures. Such, for instance, are the instantiæ conformes; Bacon's examples of which are mostly taken from comparative anatomy. One of them is the analogy between the fins of fishes, the feet of quadrupeds, and the feet and wings of birds; another, the analogy of the beak of birds and the teeth of other animals, &c.[1]

The other classes of prerogative instances have especial reference to particular investigation, and are to be collected when individual tables of comparence are formed.

It would seem from this that the theory of prerogative instances is intended to guide us in the formation of these tables. But it is difficult to see how the circumstances which give any instance its prerogative could have been appreciated à priori. An instantia crucis[2], to take the most celebrated of all, has its distinguishing character only in so far as it is viewed with reference to two contending hypotheses. In forming at the outset of an inquiry the appropriate tables, nothing would have led the interpreter to perceive its peculiar value.

This theory, whatever may be its practical utility, may supply us with new illustrations of the importance in Bacon's method of the process of exclusions.

At the head of the list—and placed there, we may presume, from the importance of the end which they promote—stand the instantiæ solitariæ, whose prerogative it is to accelerate the Exclusiva.[3] These are instances which exhibit the given nature in subjects which have nothing in common, except that nature itself, with the other subjects which present it to us. Thus the colours shown by the prism or by crystals are a solitary instance of colour, because they have nothing in common with the fixed colours of flowers, gems, &c. Whatever therefore is not independent of the particular constitution of these bodies must be excluded from the form of colour.

Next to the instantiæ solitariæ are placed the instantiæ migrantes, which show the given nature in the act of appearing

[1] Nov. Org. ii. 27. It does not seem that Bacon added much to what he found in Aristotle on the subject of these analogies.

[2] Nov. Org. ii. 36. [3] Nov. Org. ii. 22.

or of disappearing; as when glass, being pounded, becomes white. Of these it is said that they not only accelerate and strengthen the Exclusiva, but also confine within narrow limits the Affirmative, or Form itself, by showing that it is something which is given or taken away by the observed change. A little farther on Bacon notices the danger in these cases of confounding the efficient cause with the Form, and concludes by saying "But this is easily remedied by a legitimately performed Exclusiva."

Other remarks to the same effect might be made with reference to other classes of instances; but these are probably sufficient.

I shall now endeavour to give an account of Bacon's views on some questions of philosophy, which are not immediately connected with the reforms he proposed to introduce.

(13.) It has sometimes, I believe, been supposed that Bacon had adopted the atomic theory of Democritus. This however is by no means true; but certainly he often speaks much more favourably of the systems of the earlier physicists, and especially of that of Democritus, than of the philosophy of Plato and Aristotle. In doing this he may, perhaps, have been more or less influenced by a wish to find in antiquity something with which the doctrines he condemned might be contrasted. But setting this aside, it is certain that these systems were more akin to his own views than the doctrine of the schools of which Socrates may be called the founder. The problems which they proposed were essentially physical,—given certain material first principles, to determine the origin and causes of all phenomena. They were concerned, for the most part, with that which is accessible to the senses, or which would be so if the senses were sufficiently acute. In this they altogether agree with Bacon, who, though he often speaks of the errors and shortcomings of the senses, yet had never been led to consider the question which stands at the entrance of metaphysical philosophy, namely whether the subjective character of sensation does not necessarily lead to scepticism, if no higher grounds of truth can be discovered. The scepticism of Protagoras, and Plato's refutation of it, seemed to him to be both but idle subtleties. Plato, Aristotle, and their followers, were in his opinion but a better kind of sophists. What Dionysius said to

Plato, that his discourse was but dotage, might fitly be applied to them all.[1]

It cannot be denied, that to Bacon all sound philosophy seemed to be included in what we now call the natural sciences; and with this view he was naturally led to prefer the atomic doctrine of Democritus to any metaphysical speculation. Every atomic theory is an attempt to explain some of the phenomena of matter by means of others; to explain secondary qualities by means of the primary. And this was what Bacon himself proposed to do in investigating the Forms of simple natures. Nevertheless he did not adopt the peculiar opinions of Democritus and his followers. In the *Novum Organum* he rejects altogether the notion of a vacuum and that of the unchangeableness of matter.[2] His theory of the intimate constitution of bodies does not, he remarks, relate to atoms properly so called, but only to the actually existing ultimate particles. Bacon cannot therefore be said to be a follower of Democritus, though he has spoken of him as being, of all the Greek philosophers, the one who had the deepest insight into nature.[3]

But though Bacon was not an atomist, he was what has been called a mechanical physiologist. Leibnitz's remark that the restorers of philosophy[4] all held the principle that the properties of bodies are to be explained by means of magnitude, figure, and motion (a statement which envelopes every such theory of matter as that of Descartes, together with the old atomic doctrine), is certainly true of Bacon.

(14.) The opinion which Bacon had formed as to the class of subjects which ought to be included in Summary Philosophy (the English phrase by which he renders the expression he sometimes uses, namely prima philosophia), is worthy of attention.

In the writings of Aristotle, the first philosophy denotes the science which since his time has been called metaphysics. It is the science of first principles, or as he has himself defined it, the science of that which is, as such. In the first book of the *Metaphysics* we find a proof of the necessity of having such a science, distinct from and in a manner superior to all others.

Bacon, adopting Aristotle's name, applied it differently. With

[1] Redargut. Phil. et Nov. Org. i. 71.
[2] Nov. Org. ii. 8. Compare Cogit. De Nat. Rerum.
[3] Nov. Org. i. 51.; also Parm. Teles. and Dem. Phil.
[4] Namely, the Cartesians, Verulam, Hobbes, &c. See his letter to Thomasius, p. 48. of the edition of his philosophical works by Erdman.

him, the first philosophy is divided into two parts. Of these the first is to be a receptacle of the axioms which do not belong exclusively to particular sciences, but are common to more than one; while the second is to inquire into the external or adventitious conditions of existences—such as the much and the little, the like and the unlike, the possible and impossible, &c.

In illustration of the contents of the first part, Bacon quotes several axioms which are applicable in more than one science. Of these the first is, "If to unequals are added equals, the sums are unequal," which is a mathematical principle, but which, Bacon says, referring to the distinction laid down by Aristotle between commutative and distributive justice, obtains also in moral science; inasmuch as it is the rule by which distributive justice must be guided. The next is, "Things which agree with a third, agree with one another,"—which is also a mathematical principle, but yet, differently stated, forms the foundation of the theory of syllogism. Thus far Bacon's doctrine does not materially dissent from Aristotle's, who has taught the necessity of recognising in all sciences two kinds of principles, those which are proper to the subject of each science, and those which, connecting themselves with the doctrine of the categories, are common to all. The last are in his nomenclature axioms, though Bacon, following probably Ramus, who in his turn followed Cicero and the Stoics, gives a much more general sense to this word; and it is to be remarked that Aristotle has given as an instance of an axiom the first of the two which I have quoted from Bacon, or at any rate another which is in effect equivalent to it. But most of the instances which Bacon goes on to give are of a different nature. They are not derived from the laws of thought, but on the contrary involve an empirical element, and therefore are neither self evident, nor capable of an à priori proof. Thus the axiom that "a discord resolved into a concord improves the harmony," is, Bacon says, not only true in music, but also in ethics and the doctrine of the affections. But this axiom is in its literal sense merely a result of observation, and its application to moral subjects is clearly only analogical or tropical. Again, that "the organs of the senses are analogous to instruments which produce reflection," is, Bacon says, true in perspective, and also in acoustics; being true both of the eye and ear. Here we have a result of observation which is made to enter into two different sciences

simply in virtue of the classification employed. For this axiom, if true, properly belongs to physiology, and neither to perspective nor to acoustics; though in a secondary and derivative manner a portion of the truth it includes may be introduced into these sciences. And so on. There is however one of these axioms which is of higher authority: "Quantum naturæ nec minuitur nec augetur:" which, Bacon says, is true not only in physics, but also in natural theology, if it be stated in a modified form; viz. if it be said that it belongs to Omnipotence to make something out of nothing, or vice versâ. Of this axiom it may be remarked, that it is common to physics and natural theology simply because the subjects of these sciences are, in some measure, common to both; wherein it differs from the Aristotelian conception of an axiom. But it is of more interest to observe, that this axiom of which the truth is derived from our notion of substance, and which can never be established by an empirical demonstration, is constantly quoted by Bacon as a principle of incontestable truth; of which his theory of specific gravities is in some sort only an application.

The question arises both with regard to this axiom and to the others, In what manner Bacon supposed that they ought to be demonstrated; or, if he thought they required no demonstration, in what manner he conceived that the mind apprehended their truth? He has certainly affirmed in express terms that there can be only two ways of arriving at truth, namely syllogism and induction; both of which are manifestly inapplicable to some at least of the principles which he includes in the philosophia prima. But whether he would have admitted that this dictum admits of exception in relation to these cases, or on the other hand had not been led to consider the nature of the difficulty which they present, we have, I think, no means of deciding. It is to be observed that the philosophia prima is spoken of as a collection (receptaculum) of axioms—a phrase which implies that it is not a science in itself, having its own principles and an independent development, but that, contrariwise, it derives from the contributions of other sciences the elements of which it is composed. Of the second part we are unable to speak more definitely than of the first. It is obviously a reflexion of the Aristotelian doctrine of the categories[1], from

[1] Trendelenberg has accordingly quoted the passages in the *De Augmentis* which relate to it, in the historical part of his work on the categories.

which, however, Bacon intended to contrast it by requiring that the "conditiones entium," which he has doubtless called transcendent from their applicability to all classes of objects, should be treated not logically but physically.[1]

But then what are the questions to be resolved in this mode of treating them? Bacon gives some examples of the discussions which ought to occupy this part of philosophy. The first is, why there is so much of one kind of substance, and so little of another—why, for instance, so much more iron in the world than gold, &c. This belongs to the inquiry "de multo et parvo." Again, in treating "de simili et diverso," it ought to be explained why between dissimilar species are almost always interposed others which partake of the nature of both, and form, as it were, ambiguous species—for instance, bats between birds and quadrupeds, or moss between corruption and plants, &c. The difficulty however which I have already mentioned in speaking of the other part of the philosophia prima recurs with reference to this, namely by what method were the questions here proposed to be answered? If by induction, by induction on what data? and if not, by what other way of arriving at truth?

The illustrations which Bacon has given, and perhaps his way of looking at the whole subject, connect themselves with what has recently been called palæætiology. The questions which Bacon proposes are questions as to how that which actually exists, and which in the present order of things will continue to exist, came into being—whether abruptly or by slow transitions, and under what agency. He seems to point, though from a distance, to discussions as to the formation of strata and the succession of species. Yet on the other hand the discussion on Like and Unlike was to include at least one portion of a different character, namely why, in despite of the maxim "similia similibus gaudent," iron does not attract iron but the magnet, nor gold gold, but quicksilver.

(15.) Another subject, sufficiently interesting to be here mentioned, though less connected with Bacon's general views, is the doctrine which he entertained touching the nature of the soul. He distinguishes in several parts of his writings between the animal soul, common, at least in kind, to man and to the brutes, and the immortal principle infused by the divine favour

[1] De Augmentis iii. 4.

into man only.[1] To the latter he gave the name of spiraculum, which was of course suggested by the text, "Spiravit in faciem ejus spiraculum vitæ." M. Bouillet, in his edition of Bacon's philosophical works[2], condemns this doctrine of man's having two souls, and goes on to remark that Bacon was led to adopt it in deference to the opinions of the schoolmen, and that it is also sanctioned by S. Augustine. In these remarks he is much less accurate than usual; the truth being that the doctrine of the duality of the soul is condemned very strongly by S. Augustine and by the schoolmen, and that there is no doubt as to the source from which Bacon derived it, namely from the writings of Telesius. The notion of a lower soul, distinct in essence from the higher principle of man's nature, is in reality much older than Telesius. We find it for instance among the Manichees — a circumstance which makes it singular that S. Augustine should have been supposed to countenance it. Both in his work *De Ecclesiæ Dogmatibus*, and nearly in the same words in that *De Animâ*, he rejects in the most precise and accurate manner the doctrine of two distinct souls, affirming that there is but one, which is at once the principle of nutrition, of sensation, and of reason. In opposing the tenets of the Manichæans, he has more than once condemned the same doctrine, though less at length than in the works just mentioned. The schoolmen also peremptorily rejected the doctrine which M. Bouillet has affirmed that Bacon derived from them. Thus S. Thomas Aquinas says, "Impossibile est in uno homine esse plures animas per essentiam differentes, sed una tantum est anima intellectiva quæ vegetativæ et sensitivæ et intellectivæ officiis fungitur."[3] And this follows at once from the received opinion, that the soul is joined to the body as its form (ut forma unitur corpori). It would be easy to multiply citations to the same effect; but as no schoolman could venture to contradict an emphatically expressed opinion of S. Augustine, it appears unnecessary to do so.[4]

[1] De Augmentis iv. 3.

[2] Œuvres Philosophiques de Bacon. Paris, 1834.—*J. S.*

[3] S. Thom. Prim. Q. 76. a. 3. Concl.

[4] With what bold ignorance the schoolmen are sometimes spoken of is well seen in Dr. Gutwauer's preface to his edition of Leibnitz *De Principio Individui*. The sixth proposition in the *Corollarium* attached to this disputation is as follows:— "Hominis solum una est anima quæ vegetativam et sensitivam virtualiter includat." The learned Doctor declares that in this statement Leibnitz set himself in direct opposition to the schoolmen, and that it contains the germ of Leibnitz's own psychology; the statement being almost a literal transcript of that of St. Thomas Aquinas. Sum. i.

Telesius of Cozensa, whom Bacon has commended as "the best of the novellists," was one of the Italian reformers of philosophy. Tennemann's remark that the reform which he attempted to introduce was but partial, as having reference only to the natural sciences, is not altogether accurate, but it describes with sufficient correctness the general character of his writings. They contain an attempt to explain all phenomena, including those of animal life, on the hypothesis of the continuous conflict and reciprocal action of two formal principles, heat and cold. His other doctrines are either subordinated to this kind of dualism, or are merely the necessary complements of a system of philosophy. In proposing to inquire into the nature and origin of the soul, he had no other end in view than to arrive at an explanation of the phenomena of sensation, voluntary motion, &c., which should be in accordance with his fundamental hypothesis. He therefore sets out from the physiological point of view; and in order to explain the phenomena of animal and vegetable life, refers them to an indwelling spiritus, or animal soul, which in plants resides in the bark and fibres, and in animals in the white and exsanguine parts of the body, the bones being however excepted.[1] The animal and vegetable souls are in essence alike, but the latter is "paulo quam qui in animalibus inest crassior." In both cases the origin of this anima is the same; it is educed from the seed (educta ex semine), and is to all intents as truly material as any other part of the body.

In the application of these views to the soul of man, Telesius was met by considerations of another order. The soul educed ex semine, was (like the body which it animated, and of which it was only the subtlest portion) propagated by generation; whereas it was decided by orthodox theology that souls are not ex traduce, do not pass from parent to child in the way Telesius must have supposed. The soul is a gift, which after death is to return to Him who gave it. I do not conceive that Telesius's attempt to co-ordinate this doctrine with his own views arose merely from a wish to avoid the imputation of heresy. His writings are, I think, free from that tone of mocking deference to authority by which those of many of his contemporaries are

Q. 76. a. 3., to which I have already referred. Leibnitz scarcely thought that in following the Angelic Doctor, he was protesting against scholasticism.

[1] De Rerum Nat. v. 1. et vi. 26.

disfigured. They have, on the contrary, much of the melancholy earnestness which characterises those of his disciple Campanella. The difference between the faculties of men and brutes appeared to him to be such that merely a subtler organisation of the spiritus would be insufficient to account for it. Man's higher faculties are to be ascribed to a higher principle, and this can only be conceived of as a divinely formed soul. The question as to the relation between the two souls may be presented under two aspects, namely what are the faculties in man which ought to be ascribed to each of them? and again are these two souls wholly independent, and if not, how are they connected? The criterion by which Telesius would decide what ought to be reserved as the peculiar appanage of the divinely created soul, appears to be this — that which in man is analogous to the faculties we recognise in brutes ought to be ascribed to the principle by which they are animated and which we possess in common with them. Whatever, on the contrary, seems peculiar to man, more especially the sense of right and wrong, which is the foundation of all morality, ought to be ascribed to the principle which it is our prerogative to possess.[1]

As to the connexion between the two, Telesius decides "both on grounds of human reason and from the authority of Scripture" that they cannot be wholly independent of each other, and he accordingly affirms that the divinely created soul is the Form of the whole body, and especially of the spiritus itself. That the soul is the Form of the body he could not without heresy deny[2], although he condemns Aristotle for saying so; asserting that Aristotle refers to the spiritus, and not to the true soul, with which probably he was unacquainted.[3] The tendency of these views is towards materialism; the immaterial principle being annexed to the system, as it were, ab extra. Accordingly Telesius's disciple Donius, whom Bacon has more than once referred to, omits it altogether.[4]

Comparing the views of Telesius with those of Bacon, we

[1] De Rerum Naturâ, v. 2.

[2] The collection known as the Clementines contains an authoritative decision on this point. "Ut quisque deinceps asserere defendere aut tenere pertinaciter præsumpserit, quod anima rationalis non sit forma corporis humani per se et essentialiter tanquam hæreticus sit censendus." I quote from Vulpes on Duns Scotus, Disp. 46. a. 5. To this decision Telesius seems to allude, De Rer. Nat. v. 40. Campanella has expressly mentioned it.

[3] De Rer. Nat. v. 3.

[4] See his De Nat. Hominis.

see that in both the duality of the soul is distinctly asserted, and that in both the animal soul is merely material.[1] Our knowledge of the divinely derived principle must rest principally on revelation. Let this knowledge be drawn, he counsels us, from the same fountain of inspiration from whence the substance of the soul itself proceeded.

Bacon rejects or at least omits Telesius's formula, that this higher soul is the Form of the body—a formula to which either in his system or that of Telesius no definite sense could be attached. He differs from his predecessor in this also, that with him the spiritus is more a physiological and less a psychological hypothesis than with Telesius—it is at least less enwrapped in a psychological system than we find it in the *De Rerum Naturâ*.

On the other hand, he has not, I think, recognised so distinctly as Telesius or Campanella the principle that to the rational soul alone is to be referred the idea of moral responsibility; and the fine passage on the contrast of public and private good in the seventh book of the *De Augmentis* seems to show (if Bacon meant that the analogy on which it is based should be accepted as anything more than an illustration) that he conceived that something akin to the distinction of right and wrong is to be traced in the workings, conscious or unconscious, of all nature.

(16.) We are here led to mention another subject, on which again the views of Telesius appear to have influenced those of Bacon. That all bodies are animated, that a principle of life pervades the whole universe, and that each portion, beside its participation in the life of the world, has also its proper vital principle, are doctrines to which in the time of Bacon the majority of philosophical reformers were at least strongly inclined. The most celebrated work in which they are set forth is perhaps the *De Sensu Rerum* of Campanella. The share which it had in producing the misfortunes of his life is well known, and need not here be noticed.

In one of his letters to Thomasius[2], Leibnitz points out how easy the transition is from the language which the schoolmen held touching substantial forms and the workings of nature to that of Campanella: "Ita reditur ad tot deunculos quot formas substantiales et Gentilem prope polytheismum. Et certe

[1] Proceeding e matricibus elementorum, De Augm. iv. 3.
[2] P. 48. of Erdmann's edition of his philosophical works.

omnes qui de substantiis illis incorporalibus corporum loquuntur non possunt mentem suam explicare nisi translatione a Mentibus sumptâ. Hinc enim attributus illis appetitus vel instinctus ille naturalis ex quo et sequitur cognitio naturalis, hinc illud axioma: Natura nihil facit frustra, omnis res fugit sui destructionem, similia similibus gaudent, materia appetit formam nobiliorem, et alia id genus. Quum tamen reverâ in naturâ nulla sit sapientia, nullus appetitus, ordo vero pulcher ex eo oriatur, quia est horologium Dei." To the censure implied in these remarks Aristotle is himself in some measure liable, seeing that he ascribed the various changes which go on around us to the half-conscious or unconscious workings of an indwelling power which pervades all things, and to which he gives the name of Nature. Nature does nothing in vain and of things possible realises the best, but she does not act with conscious prevision. She is, so to speak, the instinct of the universe.

It is on account of these views that Bacon charges Aristotle with having set aside the doctrine of a providence, by putting Nature in the place of God.[1] Nevertheless Bacon himself thought it possible to explain large classes of phenomena by referring them, not certainly to the workings of Nature, but to the instincts and appetites of individual bodies. His whole doctrine of simple motions is full of expressions which it is very difficult to understand without supposing that Bacon had for the time adopted the notion of universally diffused sensation. Thus the "motus nexûs" is that in virtue of which bodies, as delighting in mutual contact, will not suffer themselves to be separated. All bodies, we are told, abhor a solution of continuity, and the rising of cream is to be explained by the desire of homogeneous elements for one another.

The distinction which Bacon has elsewhere taken between sensation and perception, which corresponds to Leibnitz's distinction between apperception and perception, does not appear to accord with these expressions. He there asserts that inanimate bodies have perception without sensation. But such words as *desire* and *horror* imply not only a change worked in the body to which they are applied in virtue of the presence of another, but also a sense of that presence, — that is, in Bacon's language, not only perception but sensation.

[1] De Aug. iii. 4.

The contrast between the expressions I have quoted and those of which he made use in other parts of his writings, is remarkable. In stating the doctrine of simple motions, he speaks as if all phenomena were to be explained by means of the desires and instincts of matter, every portion of which is more or less consciously sentient. But in other passages we find what at first appears to be a wholly different view, namely that phenomena are to be explained by the site, form, and configuration of atoms or ultimate particles, capable neither of desire nor fear, and in all their motions simply fulfilling the primary law impressed on them by Providence.

Nevertheless there is here no real inconsistency. For Bacon, following Telesius, ascribed all the phenomena of animal life to the spiritus, which, though it is the subtlest portion of the body which it animates, is notwithstanding as truly material as any other part. In every body, whether animated or not, dwells a portion of spirit, and it was natural therefore to ascribe to it some share of the powers which the more finely constituted spirits of animals were supposed to possess. How far however this analogy between animate and inanimate bodies ought to be carried, was a doubtful question; and we need not be surprised to find that Bacon sometimes denies and sometimes appears to admit that the latter as well as the former are, to a certain extent at least, consciously sentient. But in all cases he proposed to explain the phenomena of animal life by means of the ultimate constitution of matter. Thus such phenomena as the rising of cream, the subsidence of the lees of wine, the clinging of gold leaf round the finger, &c., were to be explained in the first instance by the instincts and appetites of portions of matter, and afterwards to receive a deeper and more fundamental explanation when these instincts and appetites were themselves shown to result from the site, form, and configuration of the ultimate particles of which all bodies are composed.

To the doctrine of universally diffused sensation, so far as he adopted it, Bacon was led by the writings of many of his contemporaries, and in particular by those of Telesius. Brucker has remarked, and with perfect truth, that this doctrine is stated as distinctly, though not so conspicuously, by Telesius as by Campanella. Added to which this doctrine serves to explain phenomena of which, without it, no explanation could readily be given. Thus Bacon is much disposed to ridicule

Gilbert for the pains he had bestowed on the subject of electrical attraction, affirming that it is merely the result of the power which friction possesses to excite the appetite of bodies for contact. This appetite "aerem non bene tolerat, sed aliud tangibile mavult."

(17.) Bacon's opinion as to Final Causes has often been discussed. It seems however scarcely necessary to refute the interpretation which on no just grounds has been given to the phrase, "causarum finalium inquisitio tanquam virgo Deo consecrata nihil parit."[1] Nihil parit, as the context plainly shows, [means simply *non parit opera*].[2] Bacon is speaking of the classification of physics and metaphysics—the one being the science of the material and efficient cause, and the other containing two parts, namely the doctrine of forms and the doctrine of final causes. To physics corresponds in practical application mechanica or mechanics—to metaphysics, magia or natural magic. But magia corresponds to metaphysique because the latter contains the doctrine of Forms; that of final causes admitting from its nature of no practical application. It is this idea which Bacon has expressed by saying that the doctrine in question is, as it were, a consecrated virgin.

It is not sufficiently remarked that final causes have often been spoken of without any reference to a benevolent intention. When it is said that the final cause of a stone's falling is "locus deorsum," the remark is at least but remotely connected with the doctrine of an intelligent providence. We are to remember that Bacon has expressly censured Aristotle for having made use of final causes without referring to the fountain from which they flow, namely the providence of the Creator. And in this censure he has found many to concur.

Again, in any case in which the benevolent intention can be perceived, we are at liberty to ask by what means and according to what laws this benevolent intention is manifested and made efficient. If this question is not to be asked, there is in the first place an end of physical science, so far as relates to every case in which a benevolent intention has been or can be recognised; and in the second, the argument à posteriori founded on the

[1] De Augm. iii. 5. See note on the place.—*J. S*

[2] I have supplied these words to complete the sentence, which ends abruptly at the bottom of a page, a fresh page having apparently been substituted for that which originally followed.—*J. S.*

contrivance displayed in the works of creation is entirely taken away.

This is, in effect, what Bacon says in the passage of the *De Augmentis* in which he complains of the abuse of final causes. If, he affirms, the physical cause of any phenomenon can be assigned as well as the final, so far is this from derogating from our idea of the divine wisdom, that on the contrary it does but confirm and exalt it. "Dei sapientia effulget mirabilius cum natura aliud agit, providentia aliud elicit, quam si singulis schematibus et motibus naturalibus providentiæ characteres essent impressi."[1] And a little farther on he expresses an opinion which we shall do well always to remember, namely that so far is the study of physical causes from withdrawing men from God and providence, that on the contrary those who have occupied themselves in searching them out have never been able to find the end of the matter without having recourse at length to the doctrine of divine providence.

In one respect Bacon seems to have overlooked the advantage which is to be derived from the study of final causes. In the sciences which relate to animal and vegetable life, the conviction that every part of the organisation has its appropriate function which conduces to the well-being of the whole, serves not only to direct our thoughts to the wisdom of the Creator, but also to guide our investigation into the nature of the organisation itself.

(18.) It will now, I think, be well to attempt to arrange the fundamental ideas of Bacon's system in the order in which, as we may conceive, they presented themselves to his mind. To do this will necessarily involve some degree of repetition; but it will enable us to form a better idea of the scope and spirit of his philosophy.

When, at the outset of his philosophical life, he looked round on the visible universe, it would seem that to him the starry heavens, notwithstanding the grandeur of the spectacle they present to us, were of less interest than things on earth. The stars in their courses declare the glory of God; but, excepting the great lights which rule the day and night, they exert no conspicuous influence on the welfare of mankind. And on the

[1] De Aug. iii. 4.

other hand it is certain that we can in nowise affect the causes by which these phenomena are produced. But on the earth beneath, and in the waters under the earth, Nature is perpetually working in ways which it is conceivable that we may be able to imitate, and in which the beneficence of the Creator, wherein His glory is to us chiefly visible, is everywhere to be traced. Wherever we turn, we see the same spectacle of unceasing and benevolent activity. From the seed of corn Nature developes the stalk, the blade, and the ear, and superinduces on the yet immature produce the qualities which make it fit for the sustenance of man. And so, too, animal life is developed from its first rudiments to all the perfection which it is capable of attaining. And though this perfection is necessarily transitory, yet Nature, though she cannot perpetuate the individual, yet continues the species by unceasing reproduction.

But the contemplation of God's works, glorious as they are, is not the whole of man's business here on earth. For in losing his first estate he lost the dominion over the creatures which was its highest privilege, and ever since has worn out few and evil days, exposed to want, sickness, and death. His works have all been vanity and vexation of spirit, his labour nearly profitless, his knowledge for the most part useless. Is his condition altogether hopeless, or may it not be possible to soften, though not to set aside, the effects of the primal curse? To this question Bacon unhesitatingly made answer, that of His great mercy God would bless our humble endeavours to restore to suffering humanity some part at least of what it had lost; and thus he has more than once described the instauration of the sciences as an attempt to regain, so far as may be, that of which the Fall deprived us.

A deep sense of the misery of mankind is visible throughout his writings. The principal speaker in the *Redargutio Philosophiarum*, and the son [father] of Solomon's House in the *New Atlantis*, both express Bacon's idea of what the philosopher ought to be; and of both it is said that their countenance was as the countenance of one who pities men. Herein we see the reason why Bacon has often been called an utilitarian; not because he loved truth less than others, but because he loved men more.

The philosopher is therefore not merely to contemplate the works of the Creator, but also to employ the knowledge thus

obtained for the relief of man's estate. If we ask how this is to be done, we find, Bacon tells us (and here he still seems to recur to the idea that the new philosophy is to be in some sort a restoration to man of his original condition), that as no one can enter into the kingdom of heaven "nisi sub personâ infantis," so, too, in order to obtain a real and fruitful insight into Nature, it is necessary to become as a little child, to abnegate received dogmas and the idols by which the mind is most easily beset, and then to follow with childlike singleness of purpose the indications which Nature gives us as to how her operations are performed. For we can command Nature only by obeying her; nor can Art avail anything except as Nature's handmaiden. We can affect the conditions under which Nature works; but things artificial as well as things natural are in reality produced not by Art but Nature. Our power is merely based upon our knowledge of the procedure which Nature follows. She is never really thwarted or controlled by our operations, though she may be induced to depart from her usual course, and under new and artificial conditions to produce new phenomena and new substances.

Natural philosophy, considered from this point of view, is therefore only an answer to the question, How does Nature work in the production of phenomena? When, to take a trivial instance, she superinduces yellowness on the green leaf, or silently and gradually transforms ice into crystal, we ask how are these changes brought about?—what conditions are necessary and sufficient in order that the phenomena we observe may be engendered? If we knew what these conditions are, we might ourselves be able to determine their existence, and then the corresponding phenomena would necessarily follow, since the course of Nature is absolutely uniform.

At this point of the development of Bacon's system, the question of method would naturally present itself to him. Having determined what the object of our inquiries is to be, we must endeavour to find a way of attaining it.

For this end Bacon, as we have seen, proposes to examine all the cases in which the phenomenon to be reproduced has been observed, and to note all the conditions which in each case accompany its production. Of all these those only can be necessary which are universally concomitant. Again he proposes to observe all the cognate cases in which, though certain of the

conditions before mentioned are present, they are not accompanied by the required phenomenon. By these two classes of observations all the superfluous conditions may be rejected, and those which remain are what we seek. Wherever we can determine their existence we can produce the phenomenon in question.

This process is what Bacon calls, in *Valerius Terminus*, the freeing of a direction, and in his later writings the investigation of the Form.

His thinking that this process would in all cases, or even generally, be successful, arose from his not having sufficiently appreciated the infinite variety and complexity of Nature. Thus he strongly condemns as most false and pernicious the common opinion that the number of individual phenomena to be observed is sensibly infinite, and commends Democritus (a commendation which seems rather to belong to Lucretius) for having perceived that the appearance of limitless variety which the first aspect of Nature presents to us disappears on a closer inspection.

The transition from this view of Nature to the idea that it was possible to form an alphabet of the universe, and to analyse all phenomena into their real elements, is manifestly easy.

By the new method of induction it would be possible to ascertain the conditions requisite and sufficient for the production of any phenomenon; and as this determination was meant chiefly to enable us to imitate Nature, or rather to direct her operations, Bacon was naturally led to assume that the conditions in question would be such that it would in all cases be possible to produce them artificially. Now the power of man is limited to the relations of space. He brings bodies together, he separates them; but Nature must do the rest. On the other hand the conditions of the existence of any phenomenon must be something which inheres more closely in the essence of the substance by which that phenomenon is exhibited than the phenomenon itself. And this something is clearly the inward configuration of the substance; that is, the form and arrangement &c. of its ultimate particles. Whiteness, for instance, depends on an even arrangement of these particles in space; and herein we perceive a perfect analogy between what man can do and what Nature requires to be done. The familiar processes of the arts consist simply in giving particular forms to portions of matter, in arranging them and setting them in motion according

to certain rules. Between arranging stones so as to form a house, and arranging particles so as to produce whiteness, there is no difference but that of scale. So in other cases. The difference of scale once set aside, it seemed to follow that the knowledge of the Form would in all cases lead to great practical results.

Thus far of the end which the new philosophy proposes to itself, and of the method which it must employ. The next question relates to the mode of procuring and arranging the materials on which this method is to work. In this part of the subject we again perceive the influence of Bacon's opinion touching the limitedness of Nature. No one acquainted with the history of natural philosophy would think it possible to form a collection of all the facts which are to be the materials on which any science is to operate, antecedently to the formation of the science itself.

In the first place, the observations necessary in order to the recognition of these facts would never have been made except under the guidance of some preconceived idea as to the subject of observation; and in the second, the statement which embodies the result of observation always involves some portion of theory. According to the common use of language, it is a fact and not a theory that in ordinary refraction the sine of the angle of incidence is to the sine of the angle of refraction in a given ratio. But the observations on which this statement is based, and the statement itself, presuppose the recognition of a portion of the theory of light, namely that light is propagated in straight lines —in other words, they presuppose the conception of a ray. Nor would these observations have been made but for the idea in the mind of the observers that the magnitude of the angle of refraction depends on that of the angle of incidence.

As we advance farther in any science, what we call facts involve more and more of theory. Thus it is a fact that the tangent of the angle of polarisation is equal to the index of refraction. But no one could have made the observations which prove it, or have stated their result in words, without a distinct conception, first of the law of refraction, and secondly of the distinguishing character of polarised light.

The history of science and the nature of the case concur in showing that observation and theory must go on together;—it is impossible that the one can be completed before the other

begins. Now although Bacon did not think that observation and experiments might altogether be laid aside when once the process of interpretation had begun (we see on the contrary that one of the works of Solomon's House was the trying of experiments suggested by previously obtained conclusions), he certainly thought it possible so to sever observation from theory that the process of collecting facts and that of deriving consequences from them might be carried on independently and by different persons. This opinion was based on an imperfect apprehension of the connexion between facts and theories; the connexion appearing to him to be merely an external one, namely that the former are the materials of the latter. With these views that which has been already noticed touching the finiteness of Nature, namely that there are but a finite and not very large number of things which for scientific purposes require to be observed[1], is altogether in accordance.

The facts on which the new philosophy was to be based, being conceivable apart from any portion of theory, and moreover not excessively numerous, they might be observed and recorded within a moderate length of time by persons of ordinary diligence.

If this registering of facts were made a royal work, it might, Bacon seems to have thought, be completed in a few years: he has at least remarked that *unless* this were done, the foundation of the new philosophy could not be laid in the lifetime of a single generation. The instauration, he has said in the general preface, is not to be thought of as something infinite and beyond the power of man to accomplish; nor does he believe that its mission can be fully completed (rem omnino perfici posse) within the limits of a single life. Something was therefore left for posterity to do; and probably the more Bacon meditated on the work he had in hand, the more was he convinced of its extent and difficulty. But the *Distributio Operis* sufficiently shows that he believed, when he wrote it, that the instauration of the sciences might speedily become an opus operatum. Of the *Historia Naturalis* on which it was to be based he there speaks, not less than of the *Novum Organum*, as of a work which he had himself accomplished, — "Tertia pars operis complectitur Phænomena Universi," — not "complecti debet." Doubtless

[1] See the Phænomena Universi, and the Partis secundæ Del., &c.

the preface was written before the work itself was commenced; still if he had not thought it possible to make good what he here proposes to do, he would have expressly said so.[1]

In a letter to Fulgenzio, written probably when Bacon was "dagli anni e da fortuna oppresso," he remarks that "these things" (the instauration of the sciences) require some ages for the ripening of them. But though he despaired of completing his design himself, and even thought that some generations must pass before it received its consummation, yet he always regarded it as a thing which sooner or later would be effectually accomplished, and which would thenceforth remain as a κτῆμα ἐς ἀεί. His instauration of the sciences had a definite end, in which when it was once attained it would finally acquiesce; nor is there anything in his writings to countenance the assumption which has been often made, that in his opinion the onward progress of knowledge was to continue throughout all time. On the contrary, the knowledge which man is capable of might, he thought, be attained, not certainly at once, but within the compass of no very long period. In this doubtless he erred; for knowledge must always continue to be imperfect, and therefore in its best estate progressive.

Bacon has been likened to the prophet who from Mount Pisgah surveyed the Promised Land, but left it for others to take possession of. Of this happy image perhaps part of the felicity was not perceived by its author. For though Pisgah was a place of large prospect, yet still the Promised Land was a land of definite extent and known boundaries, and moreover it was certain that after no long time the chosen people would be in possession of it all. And this agrees with what Bacon promised to himself and to mankind from the instauration of the sciences.

A truer image of the progress of knowledge may be derived from the symbol which, though on other grounds, Bacon himself adopted. Those who strive to increase our knowledge of the outward universe may be said to put out upon an apparently boundless sea: they dedicate themselves

"To unpathed waters—undreamed shores;"

and though they have a good hope of success, yet they know

[1] The sixth part, containing the new philosophy itself, is spoken of at the end of the *Distributio* as at least an inchoate work, which others must finish, but to which he hopes to give "initia non contemnenda."

they can subdue but a small part of the new world which lies before them.

(19.) In this respect then, as in others, the hopes of Francis Bacon were not destined to be fulfilled. It is neither to the technical part of his method nor to the details of his view of the nature and progress of science that his great fame is justly owing. His merits are of another kind. They belong to the spirit rather than to the positive precepts of his philosophy.

He did good service when he declared with all the weight of his authority and of his eloquence that the true end of knowledge is the glory of the Creator and the relief of man's estate. The spirit of this declaration runs throughout his writings, and we trust has worked for good upon the generations by which they have been studied. And as he showed his wisdom in coupling together things divine and human, so has he shown it also in tracing the demarcation between them, and in rebuking those who by confounding religion and philosophy were in danger of making the one heretical and the other superstitious.

When, not long before Bacon's time, philosophy freed itself from the tutelage of dogmatic theology, it became a grave question how their respective claims to authority might be most fitly co-ordinated. It was to meet, perhaps rather to evade, this question, that the distinction between that which is true in philosophy and that which is true in religion was proposed and adopted. But it is difficult to believe that the mind of any sincere and truth-loving man was satisfied by this distinction. Bacon has emphatically condemned it. "There is," he affirms, "no such opposition between God's word and his works." Both come from Him who is the father of lights, the fountain of all truth, the author of all good; and both are therefore to be studied with diligence and humility. To those who wish to discourage philosophy in order that ignorance of second causes may lead men to refer all things to the immediate agency of the first, Bacon puts Job's question, "An oportet mentiri pro Deo," — will you offer to the God of truth the unclean sacrifice of a lie?

The religious earnestness of Bacon's writings becomes more remarkable when we contrast it with the tone of the most illustrious of his contemporaries. Galileo's works are full of insincere deference to authority and of an affected disbelief in his own discoveries. Surely he who loves truth earnestly will be

slow to believe that the cause of truth is to be served by irony. But we must not forget the difference between the circumstances in which the two men were placed.

Next to his determination of the true end of natural philosophy and of the relation in which it stands to natural and to revealed theology, we may place among Bacon's merits his clear view of the essential unity of science. He often insists on the importance of this idea, and has especially commended Plato and Parmenides for affirming "that all things do by scale ascend to unity." The Creator is holy in the multitude of his works, holy in their disposition, holy in their unity: it is the prerogative of the doctrine of Forms to approach as nearly as possible towards the unity of Nature, and the subordinate science of Physics ought to contain two divisions relating to the same subject. One of these ought to treat of the first principles which govern all phenomena, and the other of the fabric of the universe.[1] All classifications of the sciences ought to be as veins or markings, and not as sections or divisions; nor can any object of scientific inquiry be satisfactorily studied apart from the analogies which connect it with other similar objects.

But the greatest of all the services which Bacon rendered to natural philosophy was, that he perpetually enforced the necessity of laying aside all preconceived opinions and learning to be a follower of Nature. These counsels could not to their full extent be followed, nor has he himself attempted to do so. But they contain a great share of truth, and of truth never more needful than in Bacon's age. Before his time doubtless the authority of Aristotle, or rather that of the scholastic interpretation of his philosophy, was shaken, if not overthrown. Nevertheless the systematising spirit of the schoolmen still survived, and of the reformers of philosophy not a few attempted to substitute a dogmatic system of their own for that from which they dissented.

Nor were these attempts unsuccessful. For men still leaned upon authority, and accepted as a test of truth the appearance of completeness and scientific consistency. This state of things was one of transition; and probably no one did more towards putting an end to it than Bacon. To the dealers in systems and to their adherents he opposed the solemn declaration, that

[1] The latter is in effect what is now called Kosmos.

they only who come in their own name will be received of men. He constantly exhorted the seeker after truth to seek it in intercourse with Nature, and has repeatedly professed that he was no founder of a sect or school. He condemned the arrogance of those who thought it beneath the dignity of the philosopher to dwell on matters of observation and experiment, and reminded them that the sun "æque palatia et cloacas ingreditur; nec tamen polluitur." We do not, he continues, erect or dedicate to human pride a capitol or a pyramid; we lay the foundations in the mind of man of a holy temple, whereof the exemplar is the universe. Throughout his writings the rejection of systems and authority is coupled with the assertion, that it is beyond all things necessary that the philosopher should be an humble follower of Nature. One of the most remarkable parts of the *Novum Organum* is the doctrine of Idola. It is an attempt to classify according to their origin the false and ill-defined notions by which the mind is commonly beset. They come, he tells us, from the nature of the human mind in general, from the peculiarities of each man's individual mind, from his intercourse with other men, from the formal teaching of the received philosophies. All these must be renounced and put away, else no man can enter into the kingdom which is to be founded on the knowledge of Nature.[1] Of the four kinds of idols Mersenne has spoken in his *Vérité des Sciences*, published in 1625, as of the four buttresses of the *Organum* of Verulam. This expression, though certainly inaccurate, serves to show the attention which in Bacon's time was paid to his doctrine of idola.[2]

His rejection of syllogistic reasoning in the proposed process for the establishment of axioms, was not without utility. In the middle ages and at the reform of philosophy the value of the syllogistic method was unduly exalted. Bacon was right in denying that it was possible to establish by a summary process and à priori the first principles of any science, and thence to deduce by syllogism all the propositions which that science could contain; and though he erred in rejecting deductive reasoning altogether, this error could never have exerted any practical influence on the progress of science, while the truth

[1] Nov. Org. i. 68. The word idolon is used by Bacon in antithesis to idea. He does not mean by it an idol or false object of worship.

[2] Compare Gassendi, Inst. Log.

with which it was associated was a truth of which his contemporaries required at least to be reminded. The reason of his error seems to have been that he formed an incorrect idea of the nature of syllogism, regarding it rather as an entirely artificial process than as merely a formal statement of the steps necessarily involved in every act of reasoning. However this may be, it is certain that whenever men attempted to set aside every process for the discovery of truth except induction, they must always have been led to recognise the impossibility of doing so.

Lastly, the tone in which Bacon spoke of the future destiny of mankind fitted him to be a leader of the age in which he lived. It was an age of change and of hope. Men went forth to seek in new-found worlds for the land of gold and for the fountain of youth; they were told that yet greater wonders lay within their reach. They had burst the bands of old authority; they were told to go forth from the cave where they had dwelt so long, and look on the light of heaven. It was also for the most part an age of faith; and the new philosophy upset no creed, and pulled down no altar. It did not put the notion of human perfectibility in the place of religion, nor deprive mankind of hopes beyond the grave. On the contrary, it told its followers that the instauration of the sciences was the free gift of the God in whom their fathers had trusted—that it was only another proof of the mercy of Him whose mercy is over all his works.

PHILOSOPHICAL WORKS.

PART I.

WORKS PUBLISHED, OR DESIGNED FOR PUBLICATION, AS PARTS OF THE INSTAURATIO MAGNA;

ARRANGED

ACCORDING TO THE ORDER IN WHICH THEY WERE WRITTEN.

Consilium est universum opus Instaurationis potius promovere in multis quam perficere in paucis; hoc perpetuo maximo cum ardore (qualem Deus mentibus ut plane confidimus addere solet) appetentes; ut quod adhuc nunquam tentatum sit id ne jam frustra tentetur. — *Auctoris Monitum*, 1622.

NOVUM ORGANUM.

NOTE.

Mr. Ellis's preface to the *Novum Organum* was written when he was travelling abroad and had not his books of reference about him. He was at work upon it the night he was taken ill at Mentone, a d was not afterwards able either to finish or to revise it. I have added a page or two at the end, by which the analysis of the first book is completed. Of the second book it was not necessary to say anything; the subject of it being Bacon's *method*, which has been fully discussed in the General Preface. A few bibliographical inaccuracies of little consequence in themselves I have corrected, either in notes or by the insertion of words within brackets. These were merely oversights, hardly avoidable in the first draft of a work written in such circumstances. But there are also a few opinions expressed incidentally in which I cannot altogether concur, though they have evidently been adopted deliberately. With regard to these (Mr. Ellis not being in a condition to enter into a discussion of them) I had no course but to explain the grounds of my dissent, and leave every man to decide for himself upon the questions at issue. To avoid inconvenient interruptions however, I have thrown my arguments into an appendix, and contented myself in the foot notes with marking the particular expressions which I hold to be questionable. — *J. S.*

PREFACE TO THE NOVUM ORGANUM.

BY ROBERT LESLIE ELLIS.

THE *Novum Organum* was published in 1620. Certain prolegomena to the whole of the Instauratio were prefixed to it, namely a Proœmium beginning "Franciscus de Verulamio sic cogitavit," a dedication to King James, a general preface, and an account, entitled Distributio Operis, of the parts of which the Instauratio was to consist. Of these the *Novum Organum* is the second; the *De Augmentis*, which was not then published, occupying the place of the first. Accordingly in most editions of Bacon's works the prolegomena are prefixed, not to the *Novum Organum*, but to the *De Augmentis;* and this is doubtless their natural place. Nevertheless as Bacon's general design was not completed, it seems better to allow them to remain in their original position, especially as in the Proœmium Bacon explains why he publishes one portion of the Instauratio apart from the rest. "Decrevit," he there says, speaking of himself, "prima quæque quæ perficere licuit in publicum edere. Neque hæc festinatio ambitiosa fuit, sed sollicita, ut si quid illi humanitus accideret, exstaret tamen designatio quædam ac destinatio rei quam animo complexus est," &c.

After the Proœmium and the dedication we come to the Præfatio Generalis, in which Bacon speaks of the unprosperous state of knowledge and of the necessity of a new method; and then follows the Distributio Operis. The Instauratio is to be divided into six portions, of which the first is to contain a general survey of the present state of knowledge. In the second men are to be taught how to use their understanding aright in the investigation of Nature. In the third all the phenomena of the universe are to be stored up as in a treasure-house, as the materials on which the new method is to be employed. In the fourth examples are to be given of its operation and of the results to

which it leads. The fifth is to contain what Bacon had accomplished in natural philosophy without the aid of his own method, but merely "ex eodem intellectûs usu quem alii in inquirendo et inveniendo adhibere consueverunt." It is therefore less important than the rest, and Bacon declares that he will not bind himself to the conclusions it contains. Moreover its value will altogether cease when the sixth part can be completed, wherein will be set forth the new philosophy—the result of the application of the new method to all the phenomena of the universe. But to complete this, the last part of the Instauratio, Bacon does not hope: he speaks of it as a thing "et supra vires et ultra spes nostras collocata."

The greater part of the plan traced in the Distributio remained unfulfilled. Not to speak of the last division of the Instauratio, no part of Bacon's writings can properly be referred either to the fourth or fifth, except two prefaces which are found among the fragments published by Gruter.[1] To the fifth division however M. Bouillet[2] is disposed to refer several of Bacon's philosophical writings; as, for instance, the tracts entitled *De Fluxu et Refluxu Maris*, and *Thema Cœli*. But though they correspond with the description which Bacon gives of the contents of the fifth part of the Instauratio, there is no reason to suppose that they would have been comprised in it. They were written a considerable time before the publication of the *Novum Organum*; the *Thema Cœli* being clearly of the same date as the *Descriptio Globi intellectualis*, written in 1612[3], and the *De Fluxu et Refluxu Maris* being probably written before Bacon had become acquainted with Galileo's theory of the tides. This theory was published in 1616; and it is reasonable to suppose that Bacon, who speaks of it in the *Novum Organum*, would have mentioned it in the *De Fluxu*, if the latter had not been written either before it was published, or but a short time afterwards.[4] These tracts, and the others which M. Bouillet men-

[1] Francisci Baconi de Verulamio Scripta in naturale et universali Philosophia. Amst. 1653. For a particular account of this volume, see my preface to Part III.—*J. S.*

[2] Œuvres Philosophiques de Bacon, publiées d'après les textes originaux, avec notice, sommaires et éclaircissemens, par M. N. Bouillet. Paris, 1834.—*J. S.*

[3] See the Preface to the *Descriptio Globi intellectualis*.—*J. S.*

[4] That the *De Fluxu* was written before the *Thema Cœli* is almost proved by the allusion to it in the following passage: "Verum hujusce rei demonstrationes et evidentias in anticipatione nostrâ de fluxu et refluxu maris plene tractavimus." I say *almost* proved, because Bacon in writing a piece which was designed to come after another which was not yet written, would sometimes refer to that other as if it were already done. But it is not likely that he should have done so here; for in any

tions, are clearly occasional writings not belonging to the circuit of the Instauratio.

To the fourth part have been referred the *Historia Ventorum*, the *Historia Vitæ et Mortis*, &c. This however is contrary to Bacon's description of them in the dedication to Prince Charles prefixed to the *Historia Ventorum*. They are there spoken of as the "primitiæ Historiæ nostræ naturalis." Even the general title with which the *Historia Ventorum* and the titles of five other Historiæ were published, shows that they belong not to the fourth but to the third part of the Instauratio. It is as follows: — *Historia Naturalis ad condendam Philosophiam, sive Phænomena Universi, quæ est Instaurationis Magnæ pars tertia.* It is moreover manifest that as the fourth part was to contain applications to certain subjects of Bacon's method of induction, these treatises, in which the method is nowhere employed, cannot belong to it. M. Bouillet, though he justly dissents from Shaw's [1] arrangement, by whom they are referred to the fourth part, nevertheless commits an error of the same kind by introducing into this division of the Instauratio a fragment on Motion, published by Gruter with the title *Filum Labyrinthi, sive Inquisitio legitima de Motu.* This fragment, which is doubtless anterior to the *Novum Organum*, contains many thoughts and expressions which are found more perfectly developed either in the *Novum Organum* itself, or in the Distributio Operis. It is not to be supposed that Bacon, after thus expressing himself in the Distributio—"Neque enim hoc siverit Deus ut phantasiæ nostræ somnium pro exemplari mundi edamus; sed potius benigne faveat ut apocalypsim ac veram visionem vestigiorum et sigillorum Creatoris super creaturas scribamus" — would have repeated this remarkable sentence with scarcely any alteration in another part of the Instauratio [2]; nor that he would have repeated in

general scheme the *Thema Cœli* would have come before the *De Fluxu*. In a letter to Bacon, dated 14th April 1619, Tobie Matthew speaks of Galileo's having *answered* Bacon's discourse touching the flux and reflux of the sea: but he alludes apparently to a discourse of Galileo's on that subject which had never been printed. — *J. S.*

[1] The Philosophical Works of Francis Bacon, Baron of Verulam, &c.; methodised and made English from the Originals, by Peter Shaw, M.D. London, 1733. — *J. S.*

[2] I doubt whether this argument can be safely relied upon. Among the works which were certainly meant to stand as part of the Instauratio several remarkable passages occur twice and more than twice. But there are other grounds for concluding that the *Inquisitio de Motu* was written soon after the *Cogitata et Visa* (1607). In the *Commentarius solutus*, a kind of diary which will be printed among the Occasional Works, I find the following entry under the date July 26. 1608: — "The finishing the 3 tables *De Motu, De Calore et Frigore, De Sono.*" After which follow

a somewhat less finished form the whole substance of the hundred and twenty-fifth aphorism of the first book of the *Novum Organum*. Yet we must admit this improbable supposition, if we decide on giving to the *Inquisitio legitima* the place which M. Bouillet has assigned to it. The truth is, that many of Bacon's shorter tracts preserved by Gruter and others are merely, so to speak, experimental fragments, of which the substance is embodied in his more finished writings.

Of the fourth and fifth parts of the Instauratio nothing, as I have already remarked, has been preserved except the prefaces, if indeed any other portion of them ever existed. But of the third, though it is altogether incomplete, we have nevertheless large fragments. Two years after the publication of the *Novum Organum* Bacon published the *Historia Naturalis ad condendam Philosophiam*, which has been already mentioned. In this however only the *Historia Ventorum* is contained in extenso; and of the five other Historiæ of which Bacon speaks in the dedication, and of which he proposed to publish one every month, only two are now in existence, namely the *Historia Vitæ et Mortis*, published in 1623, and the *Historia Densi et Rari* which is contained in Rawley's *Opuscula varia posthuma*, published in 1658. Of the other three, namely the Historiæ *Gravis et Levis*, *Sympathiæ et Antipathiæ Rerum*, and *Sulphuris Mercurii et Salis*, we have only the prefaces, which were published in the same volume as the *Historia Ventorum*.

These Historiæ, and the *Sylva Sylvarum*, published soon after Bacon's death by Rawley, are the only works which we are entitled to refer to the third part of the Instauratio. With respect to the former we have the authority of Bacon's own title page and dedication; and Rawley's dedication of the latter to King Charles shows that it is included under the general designation of *Historia Naturalis ad condendam Philosophiam*.[1]

Other tracts however, of more or less importance, have been

(July 27.) several pages of notes for an *Inquisitio legitima de Motu*. It would seem that this *Inquisitio* was designed originally to be the example in which the new method was to be set forth (see last section of *Cogitata et Visa*), but that the *Inquisitio de Calore et Frigore* was afterwards preferred; probably as more manageable. — *J. S.*

[1] "The whole body of the *Natural History*, either designed or written by the late Lord Viscount St. Albans, was dedicated to Your Majesty in the book *De Ventis*, about four years past, when Your Majesty was prince, so as there needed no new dedication of this work, but only in all humbleness to let Your Majesty know that it is yours." — *Dedication to the King of the Sylva Sylvarum.*

placed in the third part of the Instauratio, as for instance a fragment, published by Rawley in 1658, entitled *Historia et Inquisitio prima de Sono et Auditu et de Formâ Soni et latente processu Soni, sive Sylva Soni Auditus.* But the substance of this fragment occurs also in the *Sylva Sylvarum,* and therefore it cannot have been Bacon's intention to publish both as portions of his *Historia Naturalis.* It is probable that the *Historia de Sono et Auditu* was originally written as a portion of the general scheme of natural history [1] which was to form the third part of the Instauratio; but it is certainly superseded by the *Sylva Sylvarum,* and is therefore not entitled to the position which has generally been assigned to it. So, too, the *Historiæ Naturalis ad condendam Philosophiam Præfatio destinata* [2], published by Gruter, is clearly irreconcilable with the plan laid down in the dedication to Prince Charles of the *Historia Naturalis.* For Bacon's intention when he wrote the preface which Gruter has published was plainly to commence his *Natural History* by treating of density and rarity, and not of the natural history of the winds. Subsequently he changed his plan; and the first published portion of the third part of the Instauratio is, as we have seen, the *Historia Ventorum.* But this change of plan plainly shows that he had determined to cancel the fragment preserved by Gruter. Whenever what an author publishes or prepares for publication supersedes or contradicts unpublished and unfinished papers, these ought beyond all question to be set aside, and if published at all to be published apart from his other writings. Against some of the other fragments included in the third part of the Instauratio there is no such direct evidence as there is against those of which we have been speaking; but it only gives rise to needless confusion to mix up with what we know it was Bacon's intention to publish as portions of his *Historia Naturalis,* loose fragments touching which we have no information whatever.

From what has been said it is manifest that what we possess

[1] It was probably the table *De Sono* referred to in the *Commentarius solutus,* July 26. 1608 (see note 2. p. 74.), and designed, like the tables *De Motu* and *De Calore et Frigore,* for an example of the new method. — *J. S.*

[2] See Bouillet, vol. ii. p. 264. The preface in question is the introduction to the *Tabula Exporrectionis et Expansionis Materiæ,* a rudiment of the *Historia Densi et Rari.* It was published by Gruter, before the *Historia Densi et Rari* appeared, among the *Impetus Philosophici:* with the title, *Phænomena Universi; sive Historia Naturalis ad condendam Philosophiam. Præfatio.* M. Bouillet gives the preface only. The whole tract as given by Gruter will be found in Part III. of this edition. — *J. S.*

of the third part of the Instauratio is merely a fragment—for the *Sylva Sylvarum*, a miscellaneous collection of observations gathered for the most part out of books, nowise completes Bacon's general design. In truth it is a design which cannot be completed, there being no limit to the number of the "Phænomena universi" which are potentially if not actually cognisable; and it is to be observed that even if all the facts actually known at any instant could be collected and systematised (and even this is plainly impossible), yet still Bacon's aim would not be attained. For these facts alone would be insufficient as materials for the sixth part of the Instauratio, in which was to be contained all the knowledge of Nature man is capable of. Every day brings new facts to light not less entitled than those previously known to find a place in a complete description of the phenomena of the universe.[1] From many places in Bacon's writings it appears, as I have elsewhere remarked, that he had formed no adequate conception of the extent and variety of Nature. In a letter to R. P. Baranzan, who had apparently remarked by way of objection to Bacon's scheme of philosophy that a complete natural history would be a work of great extent and labour, Bacon observes that it would perhaps be sixfold as voluminous as that of Pliny. We have here therefore a sort of estimate of the limits which, in his judgment, the third part of the Instauratio would not exceed. What now exists of it is perhaps one twentieth in magnitude of this estimate.

Even the second part of the Instauratio, the *Novum Organum* itself, is incomplete. The second book concludes with the doctrine of prerogative instances. But in its twenty-first aphorism a number of subjects are mentioned of which this doctrine is the first, the last being the "Scala ascensoria et descensoria axiomatum." Neither this, nor any of these subjects after the first, except the last but one, is anywhere discussed in Bacon's

[1] This would be true, I think, of all new facts which were not obviously reconcilable with laws previously known. But is it not conceivable that so complete a knowledge might be attained of the *laws* of Nature, that it could not be increased or affected by the discovery of any new *fact* in Nature? If we had as complete a knowledge of other laws of Nature as we have of gravitation, for instance, new facts would still come to light, but with respect to the law of gravitation they would all say the same thing, and therefore bring no new knowledge. Every new application of mechanical power contains some new *fact* more or less connected with gravitation; yet unless a machine can be made which shall produce results not only new (i. e. such as had never been produced before) but inexplicable by the received theory of gravitation, are we not entitled to say that we know all that can be known about gravitation? —*J. S.*

writings; and our knowledge of his method is therefore incomplete. Even the penultimate division of the *Novum Organum* which was published along with the first two books, and which treats "de parascevis ad inquisitionem," has all the appearance of being a fragment, or at least of being less developed than Bacon had intended it to be.

The first part of the Instauratio is represented, not inadequately, by the *De Augmentis*, published about three years after the Distributio Operis and the *Novum Organum*. It is a translation with large additions of the *Advancement of Learning*, published in 1605; and if we regard the latter as a development of the ninth chapter of *Valerius Terminus*, which is an early fragment containing the germ of the whole of the Instauratio[1], the *De Augmentis* will appear to belong naturally to the great work of which it now forms the first and only complete portion. In the preface prefixed to it by Rawley it is said that Bacon, finding "the part relating to the Partitions of the Sciences already executed, though less solidly than the dignity of the argument demanded, . . . thought the best thing he could do would be to go over again what he had written, and to bring it to the state of a satisfactory and completed work. And in this way he considers that he fulfils the promise which he has given respecting the first part of the Instauration."[2]

From this general view of the different parts of the Instauratio, as described in the Distributio Operis, we proceed to consider more particularly the *Novum Organum*. Although it was left incomplete, it is nevertheless of all Bacon's works that upon which he bestowed the most pains. In the first book especially every word seems to have been carefully weighed; and it would be hard to omit or to change anything without injuring the meaning which Bacon intended to convey. His meaning is not always obvious, but it is always expressed with singular precision and felicity. His chaplain, Rawley, says that he had seen among his papers at least twelve yearly re-

[1] I should rather say, the germ of all that part of the Instauratio which treated of the Interpretation of Nature. For I cannot find in the *Valerius Terminus* any traces of the *first* part, of which the *Advancement of Learning* was the germ. See Note A. at the end. — *J. S.*

[2] My own reasons for thinking that the *De Augmentis* did *not* form part of the original design, together with the circumstances which, as I suppose, determined Bacon to enlarge that design so as to take it in, will be exp'ained in the preface to the *De Augmentis*. — *J. S.*

visions of the *Novum Organum*.[1] Assuming, which there is no reason to doubt, that this statement may be relied upon, it would seem to follow that the composition of the *Novum Organum* commenced in 1608. And this agrees tolerably well with the circumstance that the *Cogitata et Visa* was sent to Bodley in 1607, as we learn from the date of Bodley's reply to it. If we suppose that the tract published with this title by Gruter is the same as that which was sent to Bodley, a passage near the end acquires a significance which has not I think been remarked. In the *Cogitata et Visa* Bacon speaks of the considerations whereby he had been led to perceive the necessity of a reform in philosophy, and goes on to say that the question as to how his new method might be most fitly given to the world had been much in his thoughts. "Atque diu," he proceeds, "et acriter rem cogitanti et perpendenti ante omnia visum est ei tabulas inveniendi, sive legitimæ inquisitionis formulas . . . in aliquibus subjectis proponi tanquam ad exemplum et operis descriptionem fere visibilem.[2] . . . Visum est autem, nimis abruptum esse ut à tabulis ipsis docendi initium sumatur. Itaque idonea quædam præfari oportuisse, quod et jam se fecisse arbitratur." It was Bacon's intention therefore when he wrote the *Cogitata et Visa*, and when apparently some years later[3] he communicated it to Bodley, to publish an example of the application of his method to some particular subject—an intention which remained unfulfilled until the publication of the *Novum*

[1] "Ipse reperi in archivis Dominationis suæ autographa plus minus duodecim *Organi novi*, de anno in annum elaborati et ad incudem revocati; et singulis annis ulteriore limâ subinde politi et castigati." In the preceding sentence, he calls it "multorum annorum et laboris improbi proles."—*Auctoris Vita*, prefixed to the *Opuscula varia posthuma*, 1658. In the English Life prefixed to the *Resuscitatio*, which was published the year before, he says, "I myself have seen at the least twelve copies of the Instauration; revised year by year, one after another; and every year altered and amended in the frame thereof." I doubt whether we can fairly infer from these expressions that these twelve several copies were made in twelve several years; but substantially they bear out the inference drawn from them.—*J. S.*

[2] In the *Commentarius solutus*, under date July 26. 1608, I find the following memorandum:—"Seeing and trying whether the B. of Canterb. may not be affected in it, being single and glorious, and believing the sense.

"Not desisting to draw in the Bp. Awnd. [Bishop Andrews, probably] being single, rich, sickly, and professor to some experiments: *this after the table of motion or some other in part set in forwardness.*"

Some other memoranda in the same place relate to the gaining of *physicians*, and learning from them experiments of surgery and physic; which explains the epithet "sickly" in the above extract.—*J. S.*

[3] Bodley's answer is dated Feb. 19. 1607; i. e. 1607-8; in which he says, "I must tell you, to be plain, that you have very much wronged yourself and the world, to smother such a treasure so long in your coffer." But I do not think we can infer from this that the *Cogitata et Visa* had been *written* "some years" before. Bodley may only allude to his having kept such thoughts so long to himself.—*J. S.*

Organum. We may therefore conjecture that it was about this time that Bacon addressed himself to the great work of composing the *Novum Organum*[1]; and this agrees with what Rawley says of its having been twelve years in hand. This view also explains why the whole substance of the *Cogitata et Visa* is reproduced in the first book of the *Novum Organum*; for this tract was designed to be an introduction to a particular example of the new method of induction, such as that which we find near the beginning of the second book. Bacon's purpose in writing it was therefore the same as that which he had in view in the first book of the *Novum Organum*,—namely to procure a favourable reception for an example and illustration of his method. What has been said may be in some measure confirmed by comparing the *Cogitata et Visa* with an earlier tract,—namely the *Partis secundæ Delineatio et Argumentum.* When he wrote this tract Bacon did not propose to set forth his method merely by means of an example; on the contrary, the three ministrations to the sense, to the memory, and to the reason, of which the last is the new method of induction, were to be set forth in order and didactically. Whereas in the *Novum Organum* Bacon remarks, "incipiendum est à fine" (that is, the method of induction must be set forth before the method of collecting facts and that of arranging them so as best to assist the memory); and having said this, he goes on at once to his example,—namely, the investigation of the Form of heat. Thus it appears that after Bacon had not only decided on writing a great work on the reform of philosophy, but had also determined on dividing it into parts of which the second was to contain the exposition of his new method, he in some measure changed his plan, and resolved to set forth the essential and operative part of his system chiefly by means of an example. This change of plan appears to be marked by the *Cogitata et Visa*,—a circumstance which makes this tract one of the most interesting of the precursors of the *Novum Organum.*

That the *Partis secundæ Delineatio* is earlier than the *Cogi-*

[1] In the *Commentarius solutus*, under date July 26. 1608, I find the following memorandum:—"The finishing the Aphorisms, *Clavis interpretationis*, and then setting forth the book," and in the same page, a little after, "Imparting my *Cogitata et Visa*, with choice, ut videbitur." The aphorisms here spoken of may have been the "Aphorismi et Consilia de auxiliis mentis et accensione luminis naturalis;" a fragment containing the substance of the first, second, and third aphorisms of the first book of the *Novum Organum*, and the first, third, and sixteenth of the second. *Clavis interpretationis* was probably the name which was afterwards exchanged for *Novum Organum.* —*J. S.*

tata et Visa appears plainly from several considerations which M. Bouillet, who expresses a contrary opinion, seems to have overlooked. In the first place, whole sentences and even paragraphs of the *Cogitata et Visa* are reproduced with scarcely any alteration in the *Novum Organum;* whereas this is by no means the case with any passage of the *Partis secundæ Delineatio.* But as it may be said that this difference arises from the different character of the two tracts, of which the one is simply a summary of a larger work, whereas the more developed style of the other resembles that of the *Novum Organum,* it may be well to compare them somewhat in detail.

In speaking of the prospects which the reform of philosophy was to open to mankind, Bacon thus expresses himself in the *Novum Organum:*—"Quinetiam prudentia civilis ad consilium vocanda est et adhibenda, quæ ex præscripto diffidit, et de rebus humanis in deterius conjicit." The corresponding sentence in the *Cogitata et Visa* is, "Consentaneum enim esse, prudentiam civilem in hâc parte adhibere, quæ ex præscripto diffidit et de humanis in deterius conjicit." Again, in the *Partis secundæ Delineatio* the same idea is thus expressed, "Si quis sobrius (ut sibi videri possit,) et civilis prudentiæ diffidentiam ad hæc transferens, existimet hæc quæ dicimus votis similia videri," &c. Here the somewhat obscure phrase "civilis prudentiæ diffidentiam" is clearly the germ of that by which it is replaced in the other two passages, namely, "prudentia civilis quæ ex præscripto diffidit." Again, in the *Partis secundæ Delineatio* Bacon affirms that ordinary induction "puerile quiddam est et precario concludit, periculo ab instantiâ contradictoriâ exposita:" in the *Cogitata et Visa,* that the logicians have devised a form of induction "admodum simplicem et plane puerilem, quæ per enumerationem tantum procedat, atque propterea precario non necessario concludat." The clause "quæ per enumerationem tantum procedat," which adds greatly to the distinctness of the whole sentence, is retained in the Distributio Operis, in which it is said that the induction of the logicians, "quæ procedit per enumerationem simplicem, puerile quiddam est, precario concludit, et periculo ab instantiâ contradictoriâ exponitur." To take another case: in the *Partis secundæ Delineatio,* Bacon, speaking of those who might object to his frequent mention of practical results as a thing unworthy of the dignity of philosophy, affirms that they hinder the accomplishment of their

own wishes. "Quin etiam illis, quibus in contemplationis amorem effusis frequens apud nos operum mentio asperum quiddam atque ingratum et mechanicum sonat, monstrabimus quantum illi desideriis suis propriis adversentur, quum puritas contemplationum atque substructio et inventio operum prorsus eisdem rebus nitantur, ac simul perficiantur." In the *Cogitata et Visa*, this sentence recurs in a modified and much neater form: — "Si quis autem sit cui in contemplationis amorem et venerationem effuso ista operum frequens et cum tanto honore mentio quiddam asperum et ingratum sonet, is pro certo sciat se propriis desideriis adversari; etenim in naturâ, opera non tantum vitæ beneficia, sed et veritatis pignora esse." On comparing these two sentences, it is difficult to believe that Bacon would have omitted the antithesis with which the latter ends in order to introduce the somewhat cumbrous expressions which correspond to it in the former, especially as we find this antithesis reproduced, though with another context, in the *Novum Organum*. "Opera ipsa," it is there said, "pluris facienda sunt quatenus sunt veritatis pignora quam propter vitæ commoda."[1]

These instances will probably be thought sufficient to justify us in concluding that the *Partis secundæ Delineatio*, in which no mention is made of the plan of setting forth the new method of induction by means of an example, is of earlier date than the *Cogitata et Visa*, in which this plan, actually employed in the *Novum Organum*, is spoken of as that which Bacon had decided on adopting. This question of priority is not without interest; for if the *Partis secundæ Delineatio* is anterior to the *Cogitata et Visa*, the general plan of the Instauratio must have been formed a considerable time before 1607, about which time Bacon probably commenced the composition of the *Novum Organum*. If we could determine the date of *Valerius Terminus*, we should be able to assign limits within which the formation of this plan, so far as relates to the division of the work into six portions, may be supposed to lie. For the first book of *Valerius Terminus* was to include all that was to precede the exposition of the new method of induction, which was to be

[1] Nov. Org. i. 124. It is well to mention that some of the expressions in this aphorism which do not occur in the *Cogitata et Visa* will be found in the *Partis secundæ Delineatio*. But it will be observed that I am only comparing passages which occur in all three works. Of the greater general resemblance of the *Cogitata et Visa* to the *Novum Organum* there can be no question.

the subject of the second; that is, it was to comprehend, along with the first part of the Instauratio[1], the general reflexions and precepts which form the subject of the first book of the *Novum Organum*. Nor does it appear that *Valerius Terminus* was to contain anything corresponding to the last four parts of the Instauratio[2]; it was a work, as its title[3] shows, on the Interpretation of Nature; that is, it was to be a statement of Bacon's method, without professing either to give the collection of facts to which the method was to be applied, or the results thereby obtained. Unfortunately, there appears to be no evidence tending to enable us to assign the time at which (or not long after it) *Valerius Terminus* was written. That it is earlier than the *Advancement of Learning* seems to follow from the circumstance that Bacon, when he wrote it, designed to include in a single chapter the general survey of human knowledge which in the *Advancement* is developed into two books.[4] Bacon has on all occasions condemned epitomes, and it is therefore altogether improbable that after writing the *Advancement of Learning* he would have endeavoured to compress its contents, or even those of the second book, within the limits proposed in *Valerius Terminus*. On the other hand, we may suppose that before writing the *Advancement* he had not seen how much he had to say on the subject to which it relates. We may conclude therefore, on these and other grounds, that *Valerius Terminus* was written some time before 1605: how much before cannot be known; but as by comparing the *Partis secundæ Delineatio* and the *Cogitata et Visa* with the *Novum Organum* we have seen reason to conclude that the general plan of the Instauratio was formed before Bacon had decided on propounding his method by means of an example, so by comparing the first-named of these three works with *Valerius Terminus*, we perceive that the idea of the work on the Interpretation of Nature, that is, on the new method of induction, was anterior in Bacon's mind to that of the Instauratio.

And this conclusion is confirmed by all we know of Bacon's early writings. In the earliest of all, (if we assume that the

[1] Query. See Note A. at the end, § 1.—*J. S.*
[2] Query. See Note A. at the end, § 2.—*J. S.*
[3] "Valerius Terminus of the Interpretation of Nature; with the Annotations of Hermes Stella. A few fragments of the first book, viz.," &c.
[4] Query. See Note A. at the end, § 1.—*J. S.*

Temporis Partus Masculus, published by Gruter [1], is the same as the *Temporis Partus Maximus* mentioned by Bacon in his letter to Fulgenzio,) the most prominent notion is that true science consists in the interpretation of Nature — a phrase by which Bacon always designates a just method of induction. But nothing is said either there or in any early fragment whereby we are led to suppose that Bacon then thought of producing a great work like the Instauratio. On the contrary, in the *De Interpretatione Naturæ Proœmium* he proposes to communicate his peculiar method and the results to which it was to lead, only to chosen followers; giving to the world merely an exoteric doctrine, namely the general views of science which afterwards formed the substance of the *Cogitata et Visa* and ultimately of the first book of the *Novum Organum*. [2]

From what has been said it follows that we should form an inadequate conception of the *Novum Organum* if we were to regard it merely as a portion of the Instauratio. For it contains the central ideas of Bacon's system, of which the whole of the Instauratio is only the developement. In his early youth Bacon formed the notion of a new method of induction, and from that time forth this notion determined the character of all his speculations. Later in life he laid the plan of a great work, within the limits of which the materials to which his method was to be applied and the results thereby to be obtained might be stored up, together with a statement of the method itself. But of this great plan the interpretation of Nature was, so to speak, the soul, —the formative and vivifying principle; not only because Bacon conceived that the new method only could lead to the attainment of the great ends which he had in view, but also because it was the possession of this method which had suggested to him the hopes which he entertained. [3] There seems some reason to believe that his confidence in his peculiar method of induction did not increase as he grew older; that is to say, he admits in the *Novum Organum* that the interpretation of Nature is not so much an

[1] Say rather, "the several tracts collected by M. Bouillet under the title *Temporis Partus Masculus*." See Note A. at the end, § 3. — *J. S.*

[2] See Note A. at the end, § 4. — *J. S.*

[3] I quite agree in this, but not quite on the same grounds. In Note A. at the end of this preface, the reader will find a statement, too long for a foot-note, of such points in the foregoing argument as I consider disputable. It was the more necessary to point them out, because the arrangement of the pieces in this edition, for which I am responsible, will otherwise create a difficulty; being in some respects inconsistent with the opinions here expressed. — *J. S.*

artificial process as the way in which the mind would naturally work if the obstacles whereby it is hindered in the pursuit of truth were once set aside.[1] So that his precepts are, he says, not of absolute necessity: "necessitatem ei (arti interpretationis scilicet) ac si absque eâ nil agi possit, aut etiam perfectionem non attribuimus,"—an admission not altogether in the spirit of the earlier writings in which the art of interpretation is spoken of as a secret of too much value to be lightly revealed.[2]

If it be asked why Bacon determined on propounding his method by means of an example, the answer is to be sought for in the last paragraphs of the *Cogitata et Visa*. He seems to have thought that it would thus obtain a favourable reception, because its value would be to a certain extent made manifest by the example itself. Likewise he hoped in this way to avoid all occasion of dispute and controversy, and thought that an example would be enough to make his meaning understood by all who were capable of understanding it. "Fere enim se in eâ esse opinione, nempe (quod quispiam dixit) prudentibus hæc satis fore, imprudentibus autem ne plura quidem."

His expectations have not been fulfilled, for very few of those who have spoken of Bacon have understood his method, or have even attempted to explain its distinguishing characteristics, namely the certainty of its results, and its power of reducing all men to one common level.

Another reason for the course which he followed may not improbably have been that he was more or less conscious that he could not demonstrate the validity, or at least the practicability, of that which he proposed. The fundamental principle in virtue of which alone a method of exclusions can necessarily lead to a positive result, namely that the subject matter to which it is applied consists of a finite number of elements, each of which the mind can recognise and distinguish from the rest,

[1] Nov. Org. i. 130. "Est enim Interpretatio verum et naturale opus mentis, demptis iis quæ obstant." But compare the following passage in *Valerius Terminus*, c. 22. "that it is true that interpretation is the very natural and direct intention, action, and progression of the understanding, delivered from impediments. And that all anticipation is but a reflexion or declination by accident." So that if we may infer from the passage in the *Novum Organum* that his confidence had abated, we must suppose that when he wrote the *Valerius Terminus* it had not risen to its height. But for my own part I doubt whether his opinion on this point ever changed.—*J. S.*

[2] Not, I think, as a secret of too much value to be revealed, but as an argument too abstruse to be made popular. See Note B. at the end, where I have endeavoured to bring together all the evidence upon which the presumption in the text is founded, and to show that it proves either too much or too little.—*J. S.*

cannot, it is manifest, be for any particular case demonstrated à priori. Bacon's method in effect assumes that substances can always be resolved into an aggregation of a certain number of abstract qualities, and that their essence is adequately represented by the result of this analysis. Now this assumption or postulate cannot be made the subject of a direct demonstration, and probably Bacon came gradually to perceive more or less the difficulties which it involves. But these difficulties are less obvious in special cases than when the question is considered generally, and on this account Bacon may have decided to give instead of a demonstration of his method an example of its use. He admits at the close of the example that the operation of the method is imperfect, saying that at first it could not but be so, and implying that its defects would be removed when the process of induction had been applied to rectify our notions of simple natures. He thus seems to be aware of the inherent defect of his method, namely that it gives no assistance in the formation of conceptions, and at the same time to hope that this would be corrected by some modification of the inductive process. But of what nature this modification is to be he has nowhere stated; and it is to be remarked that in his earliest writings the difficulty here recognised is not even mentioned. In *Valerius Terminus* nothing is said of the necessity of forming correct notions of simple natures,—the method of exclusions then doubtless appearing to contain all that is necessary for the investigation of Nature.

Bacon may also have been influenced by other considerations. We have seen that he was at first unwilling that his peculiar method should become generally known. In the *De Interpretatione Naturæ Proœmium* he speaks of its being a thing not to be published, but to be communicated orally to certain persons.[1] In *Valerius Terminus* his doctrine was to be veiled in an abrupt and obscure style[2], such as, to use his own expression, would choose its reader,—that is, would remain unread except by worthy recipients of its hidden meaning. This affected obscurity appears also in the *Temporis Partus Masculus.* In this

[1] See Note B. at the end, extract 4th, and the concluding remarks in which I have explained my own view of the kind of reserve which Bacon at this time meditated. —*J. S.*

[2] See the same note, extract 1st. I cannot think it was by "abruptness and obscurity" that he proposed to effect the desired separation of readers either in *Valerius Terminus* or in the *Temporis Partus Masculus.*—*J. S.*

unwillingness openly to reveal his method Bacon coincided with the common feeling of his own and earlier times. In the middle ages no new discovery was freely published. All the secrets, real or pretended, of the alchemists were concealed in obscure and enigmatic language; and to mention a well-known instance, the anagram in which Roger Bacon is supposed to have recorded his knowledge of the art of making gunpowder is so obscure, that its meaning is even now more or less doubtful. In Bacon's own time one of the most remarkable discoveries of Galileo—that of the phases of Venus—was similarly hidden in an anagram, though the veil in this case was more easily seen through. This disposition to conceal scientific discoveries and methods is connected with the views which in the middle ages were formed of the nature of science. To know that which had previously been unknown was then regarded as the result not so much of greater industry or acuteness as of some fortunate accident, or of access to some hidden source of information: it was like finding a concealed treasure, of which the value would be decreased if others were allowed to share in it. Moreover the love of the marvellous inclined men to believe in the existence of wonderful secrets handed down by tradition from former ages, and any new discovery acquired something of the same mysterious interest by being kept back from the knowledge of the vulgar. Other causes, which need not here be detailed, increased this kind of reserve; such as the dread of the imputation of unlawful knowledge, the facility which it gave to deception and imposture, and the like.

The manner in which Bacon proposed at one time to perpetuate the knowledge of his method is also in accordance with the spirit of the middle ages. In the writings of the alchemists we meet continually with stories of secrets transmitted by their possessor to one or more disciples. Thus Artefius records the conversation wherein his master, Boemund, transmitted to him the first principles of all knowledge; and it is remarkable that in this and similar cases the disciple is called "mi fili" by his instructor—a circumstance which shows from what source Bacon derived the phrase "ad filios," which appears in the titles of several of his early pieces. Even in the *De Augmentis* the highest and most effectual form of scientific teaching is called the "methodus ad filios." [1]

[1] Lib. vi. c. 2. I cannot think however that the merit of this method had any-

When he wrote the *Cogitata et Visa*, Bacon seems to have perceived[1] how much of vanity and imposture had always been mixed up with this affectation of concealment and reserve. "Reperit autem," he there says, "homines in rerum scientiâ quam sibi videntur adepti, interdum proferendâ interdum occultandâ, famæ et ostentationi servire; quin et eos potissimum qui minus solida proponunt, solere ea quæ afferunt obscurâ et ambiguâ luce venditare, ut facilius vanitati suæ velificare possint." The matter which he has in hand, he goes on to say, is one which it were nowise fitting to defile by affectation or vain glory; but yet it cannot be forgotten that inveterate errors, like the delusions of madmen, are to be overcome by art and subtlety, and are always exasperated by violence and opposition. The result of this kind of dilemma is that the method is to be propounded in an example,—a decision in which it is probable that he was still more or less influenced by the example of those whom he here condemns.

Thus much of the connexion between the plan of the *Novum Organum* and that which Bacon laid down in the *Cogitata et Visa*. That there is no didactic exposition of his method in the whole of his writings has not been sufficiently

thing to do with *secresy*. For the distinctive object of it is stated to be the "continuatio et ulterior progressus" of knowledge; and its distinctive characteristic, the being "solito *apertior*." Its aim was to transfer knowledge into the mind of the disciple in the same form in which it grew in the teacher's mind, like a plant with its roots on, that it might continue to grow. Its other name is "traditio lampadis," alluding to the Greek torch-race; which was run, as I understand it, not between individuals, but between what we call *sides*. Each side had a lighted torch; they were so arranged that each bearer, as he began to slacken, handed it to another who was fresh; and the side whose torch first reached the goal, still a-light, was the winner. The term "filii," therefore, alludes, I think, to the successive generations, not who should inherit the secret, but who should carry on the work. Compare the remarks in the *Sapientia Veterum* (Fab. xxvi. near the end,) upon the torch-races in honour of Prometheus. "Atque continet in se monitum, idque prudentissimum, ut perfectio scientiarum a successione, non ab unius alicujus pernicitate aut facultate, expectetur. . . . . Atque optandum esset ut isti ludi in honorem Promethei, sive humanæ naturæ, instaurarentur, atque res *certamen, et æmulationem, et bonam fortunam* reciperet; neque ex unius cujuspiam face tremulâ atque agitatâ penderet." To me, I must confess, the explanation above given of Bacon's motives for desiring a select audience seems irreconcilable both with the objects which he certainly had in view and with the spirit in which he appears to have pursued them. "Fit audience, though few," he no doubt desired; and I can easily believe that he wished not only to find the fit, but also to exclude the unfit. But the question is, whether his motive in so selecting and so limiting his audience was unwillingness to part with his treasure, or solicitude for the furtherance of his work. To decide this question I have brought together all the passages in which he speaks of the "singling and adopting" of the "fit and legitimate reader." But the collection, with the remarks which it suggests, being too long for a foot-note, I have placed them at the end of this preface. See Note B.—*J. S.*

[1] See Note B., extract 7th. But observe that in the 1st, 3rd, and 4th, he shows himself quite as sensible of the vanity and imposture which such secresy had been made to subserve.—*J. S.*

remarked by those who have spoken of his philosophy; probably because what he himself regarded as a sort of exoteric doctrine, namely the views of science contained in the first book of the *Novum Organum*, have received much more attention than the method itself, which is nevertheless the cardinal point of his whole system. Bacon is to be regarded, not as the founder of a new philosophy, but as the discoverer of a new method; at least we must remember that this was his own view of himself and of his writings.

I proceed to give some account of the structure of the *Novum Organum* and of the parts into which it may be most conveniently divided.

After the preface, in which Bacon professes that it is not his intention to destroy the received philosophy, but rather that from henceforth there should be two coexisting and allied systems,—the one sufficient for the ordinary purposes of life, and such as would satisfy those who are content with probable opinions and commonly received notions; the other for the sons of science, who desire to attain to certainty and to an insight into the hidden things of Nature,—we come to the *Novum Organum* itself; which commences with some weighty sentences concerning the relation of Man to Nature. The first aphorism, perhaps the most often quoted sentence in the *Novum Organum*, occurs twice in the fragments published by Gruter; namely in the *Aphorismi et Consilia de Auxiliis Mentis*, and again in a less perfect form in the *De Interpretatione Naturæ Sententiæ* XII., both which fragments are included [by M. Bouillet][1] under the title *Temporis Partus Masculus*, though they are clearly of different dates. The wording of the aphorism in the former is almost precisely the same as in the *Novum Organum*. In all three places man is styled "naturæ minister et interpres." He is naturæ interpres, because in every object which is presented to him there are two things to be considered, or rather two aspects of the same thing,—one the phenomenon which Nature presents to the senses—the other the inward mechanism and action, of which the phenomenon in question is not only the result but also the outward sign. To pass therefore from the phenomenon to its hidden cause is to interpret the signs which enable us to become acquainted with the operations

[1] Not so included by *Gruter*. See note A. at the end, § 3.—*J. S.*

of Nature. Again, he is the minister naturæ, because in all his works he can only arrange the things with which he deals in the order and form which Nature requires. All the rest comes from her only; the conditions she requires having been fulfilled, she produces new phenomena according to the laws of her own action. Thus the two words *minister* and *interpres* refer respectively to works and contemplation — to power and knowledge—the substance of Bacon's theory of both being compressed into a single phrase. The third and fourth aphorisms are developments of the first; the second relating not to the theory of knowledge, but to the necessity of providing helps for the understanding.

Then follow (5—10.) reflections on the sterility of the existing sciences, and (11—17.) remarks on the inutility of logic. In (14.) Bacon asserts that everything must depend on a just method of induction. From (18.) to (37.) he contrasts the only two ways in which knowledge can be sought for; namely anticipations of Nature and the interpretation of Nature. In the former method men pass at once from particulars to the highest generalities, and thence deduce all intermediate propositions; in the latter they rise by gradual induction and successively, from particulars to axioms of the lowest generality, then to intermediate axioms, and so ultimately to the highest. And this is the true way, but as yet untried.

Then from (38.) to (68.) Bacon developes the doctrine of idols. It is to be remarked that he uses the word idolon in antithesis to idea, the first place where it occurs being the twenty-third aphorism. "Non leve quiddam interest," it is there said, "inter humanæ mentis idola et divinæ mentis ideas." He nowhere refers to the common meaning of the word, namely the image of a false god. Idols are with him "placita quædam inania," or more generally, the false notions which have taken possession of men's minds. The doctrine of idols stands [he says] in the same relation to the interpretation of Nature, as the doctrine of fallacies to ordinary logic.

Of idols Bacon enumerates four kinds,—the idols of the tribe, of the cave, of the market-place, and of the theatre; and it has been supposed that this classification is borrowed from Roger Bacon, who in the beginning of the *Opus Majus* speaks of four hindrances whereby men are kept back from the attainment of true knowledge. But this supposition is for several

reasons improbable. The *Opus Majus* was not printed until the eighteenth century, and it is unlikely that Francis Bacon would have taken the trouble of reading it, or any part of it, in manuscript.[1] In the first place there is no evidence in any part of his works of this kind of research, and in the second he had no high opinion of his namesake, of whom he has spoken with far less respect than he deserves. The only work of Roger Bacon's which there is any good reason for believing that he was acquainted with is a tract on the art of prolonging life, which was published at Paris in 1542, and of which an English translation appeared in 1617. The general resemblance between the spirit in which the two Bacons speak of science and of its improvement is, notwithstanding what has sometimes been said, but slight. Both no doubt complain that sufficient attention has not been paid to observation and experiment, but that is all; and these complaints may be found in the writings of many other men, especially in the time of Francis Bacon. Nothing is more clear than that the essential doctrines of his philosophy — among which that of idols is to be reckoned — are, so far as he was aware, altogether his own. There is moreover but little analogy between his idols and his namesake's hindrances to knowledge. The principle of classification is altogether different, and the notion of a real connexion between the two was probably suggested simply by there being the same number of idols as of hindrances.[2] It is therefore well to remark that in the early form of the doctrine of idols there were only three. In the *Partis secundæ Delineatio* the idols wherewith the mind is beset are said to be of three kinds: they either are inherent and innate or adscititious; and if the latter, arise either from received opinions in philosophy or from

[1] I can hardly think that he would have omitted to look into a work like the *Opus Majus*, if he had had the opportunity. But it is very probable that no copy of it was procurable; possible that he did not even know of its existence. The manner in which he speaks of Roger Bacon in the *Temporis Partus Masculus*, as belonging to the "utile genus" of experimentalists, "qui de theoriis non admodum soliciti *mechanicâ quâdam subtilitate rerum inventarum extensiones prehendunt*," seems rather to imply that he knew of him at that time chiefly by his reputation for mechanical inventions. — *J. S.*

[2] That the two may be the more conveniently compared, I have quoted Roger Bacon's exposition of his "offendicula," in a note upon the 39th aphorism, in which the names of the four "Idols" first occur. How slight the resemblance is between the two may be ascertained by a very simple test. If you are already acquainted with Francis Bacon's classification, try to assign each of the "offendicula" to its proper class. If not, try by the help of Roger's classification to find out Francis's. — *J. S.*

wrong principles of demonstration. This classification occurs also in *Valerius Terminus.*[1]

The first of these three classes corresponds to the first and second of those spoken of in the *Novum Organum.* The idols of the tribe are those which belong, as Aristotle might have said, to the human mind as it is human,—the erroneous tendencies common more or less to all mankind. The idols of the cave arise from each man's mental constitution: the metaphor being suggested by a passage in the [opening of the seventh book of Plato's *Republic.*][2] Both classes of extraneous idols mentioned in the *Partis secundæ Delineatio* are included in the idola theatri, and the idola fori correspond to nothing in the earlier classification.[3] They also are extraneous idols, but result neither from received opinions nor erroneous forms of demonstration, but from the influence which words of necessity exert. They are called idols of the market-place because they are caused by the daily intercourse of common life. "Verba," remarks Bacon, "ex captu vulgi imponuntur."

It is only when we compare the later with the earlier form of the doctrine of idols that we perceive the principle of classification which Bacon was guided by, namely the division of idols according as they come from the mind itself or from without.[4] In the *Novum Organum* two belong to the former class and two to the latter, so that the members of the classification are better balanced[5] than in the previous arrangement: in both perhaps we perceive a trace of the dichotomizing principle of Ramus, one of the seeming novelties which he succeeded in making popular.[6]

[1] Not in *Valerius Terminus.* It occurs in the *Distributio Operis,* and may be traced though less distinctly in the *Advancement* and the *De Augmentis.* See Note C. at the end. — *J. S.*

[2] Mr. Ellis had written "in the of Aristotle." But the words of the *De Augmentis* (v. 4.) ("de specu *Platonis*") prove that it was the passage in Plato which suggested the metaphor. — *J. S.*

[3] i. e. in the classification adopted in the *Partis secundæ Delineatio;* for they correspond exactly with the third kind of fallacies or false appearances mentioned in the *Advancement,* and with the idols of the palace in *Valerius Terminus.* And I think they were meant to be included among the "Inhærentia et Innata" of the *Delineatio.* See Note C. — *J. S.*

[4] Rather, I think, as they are separable or inseparable from our nature and condition in life. See Note C.—*J. S.*

[5] Compare the Distributio Operis, where the classification is retained, with the *Novum Organum,* where it is not alluded to, and I think it will be seen that Bacon did not intend to balance the members in this way. See Note C. at the end. — *J. S.*

[6] Bacon alludes to Ramus in the *De Augmentis* vi. 2., "De unicâ methodo et dichotomiis perpetuis nil attinet dicere. Fuit enim nubecula quædam doctrinæ quæ cito transiit: res certe simul et scientiis damnosissima," &c.

After enumerating the four kinds of idols, Bacon gives instances of each (45—67.); and speaking in (62.) of idols of the theatre, introduces a triple classification of false philosophies, to which he seems to have attached much importance, as we find it referred to in many parts of his writings. False philosophy is sophistical, empirical, or superstitious; sophistical, when it consists of dialectic subtleties built upon no better foundation than common notions and every-day observation; empirical, when it is educed out of a few experiments, however accurately examined; and superstitious, when theological traditions are made its basis. In the *Cogitata et Visa* he compares the rational philosophers (that is, those whose system is sophistical,— the name implying that they trust too much to reason and despise observation) to spiders whose webs are spun out of their own bodies, and the empirics to the ant which simply lays up its store and uses it. Whereas the true way is that of the bee, which gathers its materials from the flowers of the field and of the garden, and then, ex propriâ facultate, elaborates and transforms them.[1] The third kind of false philosophy is not here mentioned. In the *Novum Organum* Bacon perhaps intended particularly to refer to the Mosaical philosophy of Fludd, who is one of the most learned of the Cabalistic writers.[2]

In (69.) Bacon speaks of faulty demonstrations as the defences and bulwarks of idols, and divides the common process for the establishment of axioms and conclusions into four parts, each of which is defective. He here describes in general terms the new method of induction. In the next aphorism, which concludes this part of his subject, he condemns the way in which experimental researches have commonly been carried on.

The doctrine of idols seems, when the *Novum Organum* was published, to have been esteemed one of its most important portions. Mersenne at least, the earliest critic on Bacon's writings, his *Certitude des Sciences* having been published in

[1] In the *Advancement of Learning* and the *De Augmentis*, the schoolmen in particular are compared to the spider; a passage which has been misunderstood by a distinguished writer, whose judgments seem not unfrequently to be as hastily formed as they are fluently expressed, and who conceives that Bacon intended to condemn the study of psychology.

In speaking of the field and the garden, Bacon refers respectively to observations of Nature and artificial experiment; an instance of the "curiosa felicitas" of his metaphors.

[2] Fludd's work, entitled *Philosophia Moysaica*, was published in 1638.

1625[1], speaks of the four idols, or rather of Bacon's remarks upon them, as the four buttresses of his philosophy. In Bacon's own opinion this doctrine was of much importance. Thus in the *De Interpretatione Naturæ Sententiæ Duodecim* he says, in the abrupt style of his earlier philosophical writings, "Qui primum et ante alia omnia animi motus humani penitus non explorarit, ibique scientiæ meatus et errorum sedes accuratissime descriptas non habuerit, is omnia larvata et veluti incantata reperiet; fascinum ni solverit interpretari non poterit.[2]

From (71.) to (78.) he speaks of the signs and tokens whereby the defects and worthlessness of the received sciences are made manifest. The origin of these sciences, the scanty fruits they have borne, the little progress they have made, all testify against them; as likewise the confessions of the authors who have treated of them, and even the general consent with which they have been received. "Pessimum," says Bacon, "omnium est augurium, quod ex consensu capitur in rebus intellectualibus."[3]

From (78.) to (92.) Bacon speaks of the causes of the errors which have hindered the progress of science; intending thereby to show that there is no reason to doubt the value of the reform which he is about to propose, because though in itself seemingly plain and obvious it has nevertheless remained so long unthought of. On the contrary, there is, he affirms, good reason for being surprised that even now any one should have thought of it.

The first of these causes is the comparative shortness of the periods which, out of the twenty-five centuries which intervene between Thales and Bacon's own time, have been really favourable to the progress of science. The second, that even during the more favourable times natural philosophy, the great mother of the sciences, has been for the most part neglected; men having of late chiefly busied themselves with theology, and among the Greeks and Romans with moral philosophy, "quæ

[1] In the *Biographie Universelle* (Mersenne) it is incorrectly said that this work was published in 1636, and an idle story is mentioned that it was in reality written, not by Mersenne, but by Lord Herbert of Cherbury,—a story sufficiently refuted by its scrupulous and submissive orthodoxy.

[2] So also in the *Valerius Terminus*, c. 17.: "That if any have had or shall have the power and resolution to fortify and inclose his mind against all anticipations, yet if he have not been or shall not be cautioned by the full understanding of the nature of the mind and spirit of man, and therein of the seats, pores, and passages both of knowledge and error, he hath not been, nor shall not be, possibly able to guide or keep on his course aright."—*J. S.*

[3] He however excepts matters political and religious.

ethnicis vice theologiæ erat." Moreover, even when men occupied themselves the most with natural philosophy (Bacon refers to the age of the early Greek physicists), much time was wasted through controversies and vain glory. Again, even those who have bestowed pains upon natural philosophy have seldom, especially in these latter times, given themselves wholly up to it. Thus, natural philosophy having been neglected and the sciences thereby severed from their root, it is no wonder that their growth has been stopped.

Another cause of their scanty progress is, that their true end, the benefit and relief of man's estate, has not been had in remembrance. This error Bacon speaks of in the *Advancement* as the greatest of all, coupling however there with the relief of man's estate the glory of the Creator. Again, the right path for the advancement of knowledge has not only been neglected but blocked up, men having come not only to neglect experience but also to despise it. Also the reverence for antiquity has hindered progress; and here Bacon repeats the remark he had made in the *Advancement*, that antiquity was the world's youth, and the latter times its age.[1]

Again, the progress of science has been hindered by too much respect for what has been already accomplished. And this has been increased by the appearance of completeness which systematic writers on science have given to their works, and also by the vain and boastful promises of some who have pretended to reform philosophy. Another reason why more has not been accomplished, is that so little has been attempted.

To these hindrances Bacon adds three others,—superstitious bigotry, the constitution of schools, universities, and colleges, and the lack of encouragement; and then concludes this part of the subject with that which he affirms to have been the greatest

[1] This remark is in itself not new; we read, for instance, in the book of Esdras, that the world has lost its youth, and that the times begin to wax old. Nor is it new in the application here made of it. Probably several writers in the age which preceded Bacon's had already made it, for in that age men were no longer willing to submit to the authority of antiquity, and still felt bound to justify their dissent. Two writers may at any rate be mentioned by whom the thought is as distinctly expressed as by Bacon, namely Giordano Bruno and Otto Casmann; the former in the *Cena di Cenere*, the latter in the preface to his *Problemata Marina*, which was published in 1596, and therefore a few years later than the *Cena*, with which however it is not likely that Casmann was acquainted. Few writers of celebrity comparable to Bruno's appear to have been so little read.

I have quoted both passages in a note on the corresponding passage in [the first book of] the *De Augmentis*: that in the *Cena di Cenere* was first noticed by Dr. Whewell. See his *Philosophy of the Inductive Sciences*, ii. 198.

obstacle of all, namely despair of the possibility of progress. To remove this, he goes on to state the grounds of hope for the future,—a discussion which extends from (93.) to (115.).

"Principium autem," he begins, "sumendum a Deo;" that is to say, the excellence of the end proposed is in itself an indication that the matter in hand is from God, nor is the prophecy of Daniel concerning the latter times to be omitted, namely that many shall go to and fro and knowledge shall be increased. Again, the errors committed in time past are a reason for hoping better things in the time to come. He therefore sets forth these errors at some length (95—107.). This enumeration begins with the passage already mentioned [as occurring in the *Cogitata et Visa*], in which the true method is spoken of as intermediate to those of the dogmatici or rationales, and of the empirici. There will be, he concludes, good ground for hope when the experimental and reasoning faculties are more intimately united than they have ever yet been. So likewise when natural philosophy ceases to be alloyed with matter extraneous to it, and when any one can be found content to begin at the beginning and, putting aside all popularly received notions and opinions, to apply himself afresh to experience and particulars. And here Bacon introduces an illustration which he has also employed elsewhere, comparing the regeneration of the sciences to the exploits of Alexander, which were at first esteemed portentous and more than human, and yet afterwards it was Livy's judgment that he had done no more than despise a vain show of difficulty. Bacon then resumes his enumeration of the improvements which are to be made, each of which will be a ground of hope. The first is a better natural history than has yet been composed; and it is to be observed that a natural history which is designed to contain the materials for the instauration of philosophy differs essentially from a natural history which has no such ulterior end: the chief difference is, that an ordinary natural history does not contain the experimental results furnished by the arts. In the second place, among these results themselves there is a great lack of experimenta lucifera, that is of experiments which, though not practically useful, yet serve to give light for the discovery of causes and axioms: hitherto men have busied themselves for the most part with experimenta fructifera, that is experiments of use and profit. Thirdly, experimental researches must be conducted orderly and according

to rule and law, and not as hitherto in a desultory and irregular manner. Again, when the materials required have been collected, the mind will not be able to deal with them without assistance and memoriter: all discoveries ought to be based upon written records — "nulla nisi de scripto inventio probanda est." This is what Bacon calls experientia litterata[1], his meaning apparently being that out of the storehouse of natural history all the facts connected with any proposed subject of investigation should be extracted and reduced to writing before anything else is done. Furthermore, all these facts must not only be reduced to writing, but arranged tabularly. In dealing with facts thus collected and arranged, we are to regard them chiefly as the materials for the construction of axioms, our path leading us upwards from particulars to axioms, and then downwards from axioms to works; and the ascent from particulars to axioms must be gradual, that is axioms of a less degree of generality must always be established before axioms of a higher. Again a new form of induction is to be introduced; for induction by simple enumeration is childish and precarious. But true induction analyses nature by rejections and exclusions, and concludes affirmatively after a sufficient number of negatives. And our greatest hope rests upon this way of induction. Also the axioms thus established are to be examined whether they are of wider generality than the particulars employed in their construction, and if so, to be verified by comparing them with other facts, "per novorum particularium designationem[2], quasi fidejussione quâdam." Lastly, the sciences must be kept in connexion with natural philosophy.

Bacon then goes on (108—114.) to state divers grounds of hope derived from other sources than those of which he has been speaking, namely, the errors hitherto committed. The first is that without any method of invention men have made certain notable discoveries; how many more, then, and greater,

[1] "Illâ vero in usum veniente, ab experientiâ *factâ demum literatâ*, melius sperandum." In Montagu's edition *literatâ* is printed incorrectly with a capital letter; which makes it seem as if the *experientia facta literata* here spoken of were the same as the *experientia quam vocamus literatam* in Aph. 103. But they are, in fact, two different things; the one being opposed to experience which proceeds without any written record of its results; the other to *vaga experientia et se tantum sequens* — experience which proceeds without any method in its inquiries. See my note on Aph. 101. — *J. S.*

[2] I understand *designatio* here to mean *discovery*. The test of the truth of the axiom was to be the discovery by its light of *new* particulars. See *Valerius Terminus*, ch. xii., quoted in note on Aph. 106. — *J. S.*

by the method now to be proposed. Again, of discoveries already made, there are many which before they were made would never have been conceived of as possible, which is a reason for thinking that many other things still remain to be found out of a nature wholly unlike any hitherto known. In the course of ages these too would doubtless some time or other come to light; but by a regular method of discovery they will be made known far more certainly and in far less time, —*propere et subito et simul.* Bacon mentions particularly, as discoveries not likely to have been thought of beforehand, gunpowder, silk, and the mariner's compass; remarking that if the conditions to be fulfilled had been stated, men would have sought for something far more akin than the reality to things previously known: in the case of gunpowder, if its effects only had been described, they would have thought of some modification of the battering-ram or the catapult, and not of an expansive vapour; and so in the other cases. He also mentions the art of printing as an invention perfectly simple when once made, and which nevertheless was only made after a long course of ages. Again, we may gain hope from seeing what an infinity of pains and labour men have bestowed on far less matters than that now in hand, of which if only a portion were given to the advancement of sound and real knowledge, all difficulties might be overcome. This remark Bacon makes with reference to his natural and experimental history, which he admits will be a great and royal work, and of much labour and cost. But the number of particulars to be observed ought not to deter us; on the contrary, if we consider how much smaller it is than that of the figments of the understanding, we shall find even in this grounds for hope. To these figments, commenta ingenii, the phænomena of Nature and the arts are but a mere handful. Some hope too, Bacon thinks, may be derived from his own example; for if, though of weak health, and greatly hindered by other occupations, and moreover in this matter altogether "protopirus" and following no man's track nor even communicating these things with any, he has been able somewhat to advance therein, how much may not be hoped for from the conjoined and successive labours of men at leisure from all other business? Lastly, though the breeze of hope from that new world were fainter than it is, still it were worth while to follow the adventure, seeing how great a reward success would bring.

And here (115), Bacon says, concludes the pulling-down part, pars destruens, of the Instauration. It consists of three confutations; namely, of the natural working of the mind, of received methods of demonstration, and of received theories or philosophies. In this division we perceive the influence of the first form of the doctrine of Idols. As the *Novum Organum* now stands, the pars destruens cannot be divided into three portions, each containing one of the confutations just mentioned. Thus, for instance, the doctrine of Idols, which undoubtedly forms a distinct section of the whole work, relates to all three. Errors natural to the mind, errors of demonstration, errors of theory, are all therein treated of; and Bacon then goes on to another part of the subject, in which, though from a different point of view, they are all again considered. The sort of cross division here introduced is explained by a passage in the *Partis secundæ Delineatio*, in which the doctrine of Idols is introduced by the remark, "Pars destruens triplex est secundum triplicem naturam idolorum quæ mentem obsident." And then, after dividing idols into the three classes already mentioned, he proceeds thus: — "Itaque pars ista quam destruentem appellamus tribus redargutionibus absolvitur, redargutione philosophiarum, redargutione demonstrationum, et redargutione rationis humanæ nativæ." When the doctrine of Idols was thrown into its present form it ceased to afford a convenient basis for the pars destruens; and accordingly the substance of the three redargutiones is in the *Novum Organum* less systematically set forth than Bacon purposed that it should be when he wrote the *Partis secundæ Delineatio.*[1] It is to be remarked that *Redargutio Philosophiarum* is the title of one of the chapters in the third and last of the tracts published by Gruter with the

[1] I think this apparent discrepancy may be better explained. It appears to me that the number of idols was originally three, — the Tribe, the Cave, and the Market-place; all belonging to the *ratio humana nativa*; fallacies innate or inherent in the human understanding, — to be guarded against, but not to be got rid of; and that a fourth was added afterwards, but of quite a different kind; consisting of fallacies which have no natural affinity to the understanding, but come from without and may be turned out again; impressions derived from the systems which men have been taught to accept as true, or from the methods of demonstration which they have been taught to rely upon as conclusive. These are the Idols of the Theatre, and the sole objects of the two Redargutiones which stand first in the *Delineatio*, and last in the *Novum Organum*. If this be true, the *Redargutio rationis humanæ nativæ* (or I should rather say, the part of the *Novum Organum* which belongs to it) extends from the 40th to the 60th aphorism; and the *Redargutio Philosophiarum* and *Demonstrationum* from the 61st to the 115th. For a fuller explanation and justification of this view, see Note C.—*J. S.*

title *Temporis Partus Masculus*[1], and that it is also the title of a tract published [by Stephens in 1734, and reprinted] by Mallet [in 1760[2]], and evidently of a later date than the other of the same name.

From (116) to (128) Bacon endeavours to obviate objections and unfavourable opinions of his design. In the first place he plainly declares that he is no founder of a sect or school, — therein differing from the ancient Greeks, and from certain new men, namely Telesius, Patricius, and Severinus. Abstract opinions on nature and first principles are in his judgment of no great moment. Nor again does he promise to mankind the power of accomplishing any particular or special works — for with him works are not derived from works nor experiments from experiments, but causes and axioms are derived from both, and from these new works and experiments are ultimately deduced; and at present the natural history of which he is in possession is not sufficient for the purposes of legitimate interpretation, that is, for the establishment of axioms. Again, that his *Natural History* and *Tables of Invention* are not free from errors, which at first they cannot be, is not a matter of much importance. These errors, if not too numerous, will readily be corrected when causes and axioms have been discovered, just as errors in a manuscript or printed book are easily corrected by the meaning of the passage in which they occur. Again, it may be said that the *Natural History* contains many commonplace things; also many things mean and sordid; and lastly many things too subtle to be of any use. To this a threefold answer is to be given. In the first place, rare and notable things cannot be understood, much less new things brought to light, unless the causes of common things and their causes' causes be duly examined and searched out. Secondly, whatever is worthy of existence is also worthy to be known; for knowledge represents and is the image of existence. Lastly, things apparently useless are in truth of the greatest use. No one will deny that light is useful, though it is not tangible or material. And the accurate knowledge of simple natures is as light, and

[1] Say rather, "is the title prefixed by M. Bouillet to the second chapter of the fragment printed by Gruter with the heading *Tradendi modus legitimus.*" I cannot find that M. Bouillet had any authority for giving it this title, more than the tenor of the chapter itself, which shows that it fits.—*J. S.*

[2] A small portion of it was printed by Gruter at the end of the *Partis secundæ Delineatio* [and it seems to have been the beginning of the *Pars secunda* itself].

gives access to all the secrets on which works depend, though in itself it is of no great use.

Again it may be thought a hard saying that all sciences and authors are at once to be set aside together. But in reality this is both a more modest censure and one that carries with it a greater show of reason than any partial condemnation. It implies only that the errors hitherto committed are fundamental, and that they have not been corrected because as yet they have not been sufficiently examined. It is no presumption if any man asserts that he can draw a circle more truly with a pair of compasses than another can without; and the new method puts men's understandings nearly on the same level, because everything is to be done by definite rules and demonstrations. Bacon anticipates also another objection, that he has not assigned to the sciences their true and highest aim; which is the contemplation of truth, — not works, however great or useful. He affirms that he values works more inasmuch as they are signs and evidences of truth than for their practical utility. It may also, he continues, be alleged that the method of the ancients was in reality the same as ours, only that after they had constructed the edifice of the sciences they took away the scaffolding. But this is refuted both by what they themselves say of their method[1], and by what is seen of it in their writings. Again he affirms that he does not inculcate, as some might suppose, a[2] [final suspension of judgment, as if the mind were incapable of knowing anything; that if he enjoins caution and suspense it is not as doubting the competency of the senses and understanding, but for their better information and guidance; that the method of induction which he proposes is applicable not only to what is called natural philosophy, as distinguished from logic, ethics, and politics, but to every department of knowledge; the aim being to obtain an insight into the nature of things by processes varied according to the conditions of the subject; and that in declaring that no great progress can be expected either in knowledge of truth or in power of operation by the methods of inquiry hitherto employed, he means no disrespect to the received arts and

[1] I have adopted here the correction introduced into the text of the present edition.

[2] Mr. Ellis had written thus far when the fever seized him. The remaining pages which complete the analysis of the first book, are mine.—*J. S.*

sciences, but fully recognises them as excellent in their proper place and use, and would have them honoured and cultivated accordingly.

These explanations, — together with some remarks (129), by way of encouragement to followers and fellow-labourers, on the dignity, importance, and grandeur of the end in view, — bring the preliminary considerations to a close, and clear the way for the exposition of the art of interpretation itself; which is commenced, but not completed, in the second book. What this art was, has been fully discussed in the general preface, and it is not necessary therefore to follow the subject further here. Only it is important to remark that whatever value Bacon may have attached to it, he certainly did not at this time profess to consider it either as a thing absolutely necessary, or even as the thing most necessary, for any real progress in science. In the concluding aphorism of the first book he distinctly warns the reader that the precepts which he is about to give, though he believes them to be very useful and sound, and likely to prove a great help, are not offered either as perfect in themselves or as so indispensable that nothing can be done without them. Three things only he represents as indispensable: 1st, ut "justam naturæ et experientiæ historiam præsto haberent homines atque in eâ sedulo versarentur;" 2nd, "ut receptas opiniones et notiones deponerent;" 3rd, "ut mentem a generalissimis et proximis ab illis ad tempus cohiberent." These three conditions being secured, the art of interpretation (being indeed the true and natural operation of the mind when freed from impediments) might, he thinks, suggest itself without a teacher: "fore ut etiam vi propriâ et genuinâ mentis, absque aliâ arte, in formam nostram interpretandi incidere possent; est enim interpretatio verum et naturale opus mentis, demptis iis quæ obstant:" an admission which helps to account for the fact that during the five years which he afterwards devoted to the developement of his philosophy, he applied himself almost exclusively to the natural history; leaving the exposition of his method of interpretation still incomplete. For it cannot be denied that, among the many things which remained to be done, the setting forward of the *Natural History* was, according to this view, the one which stood next in order of importance. In furtherance of the two other principal requisites, he had al-

ready done what he could. Every motive by which men could be encouraged to lay prejudices aside, and refrain from premature generalisations, and apply themselves to the sincere study of Nature, had already been laid before them. It remained to be seen whether his exhortations would bring other labourers into the field; but in the mean time the question lay between the completion of the *Novum Organum*, which was not indispensable, and the commencement of the collection of a *Natural History*, which was; and when he found that other labourers did *not* come forward to help, he naturally applied himself to the latter.]

NOTES.

NOTE A.

I THOUGHT it better not to interrupt the reader with notes during the progress of the foregoing argument, but as some points are assumed in it upon which I shall have to express a different opinion hereafter, it may be well to notice them here; the rather because I fully concur in the conclusion notwithstanding.

1. It is assumed that the first book of *Valerius Terminus* was designed to comprehend a general survey of knowledge, such as forms the subject of the second book of the *Advancement of Learning* and of the last eight books of the *De Augmentis Scientiarum*, as well as the general reflexions and precepts, which form the subject of the first book of the *Novum Organum*;—to comprehend in short the whole first part of the Instauratio, together with the introductory portion of the second.

This is inferred from the description of the "Inventary" which was to be contained in the tenth chapter of *Valerius Terminus*, as compared with the contents of the second book of the *Advancement of Learning*.

Now my impression is that this Inventary would have corresponded, not to the second book of the *Advancement*, but only to a certain *Inventarium opum humanarum* which is there, and also in the *De Augmentis* (iii. 5), set down as a *desideratum*; and which was to be, not a general survey of all the departments of knowledge, but merely an appendix to one particular department; that, namely, which is called in the *Advancement Naturalis Magia, sive Physica operativa major*[1]; and in the *Catalogus Desideratorum* at the end of the *De Augmentis, Magia Naturalis, sive Deductio formarum ad opera*.

The grounds of this conclusion will be explained fully in their proper place.[2] It is enough at present to mark the point as disputable; and to observe that if this argument fails, there seems to be no reason

[1] See margin. It is to be observed that in Montagu's edition of the *Advancement* the titles in the margin are by some strange negligence omitted; so that the correspondence between the two Inventaries was the more easily overlooked.

[2] See my note at the end of Mr. Ellis's preface to *Valerius Terminus*.

for thinking that anything corresponding to the *first* part of the Instauratio entered into the design of *Valerius Terminus;* also that the principal ground here alleged for concluding that *Valerius Terminus* was written some time before the *Advancement*—a conclusion which involves one considerable difficulty—is taken away.

2. It is assumed also that *Valerius Terminus* was *not* to contain anything corresponding to the last four parts of the Instauratio, but was to be merely "a statement of Bacon's method, without professing to give either the collection of facts to which the method was to be applied, or the results thereby obtained."

This appears to be inferred chiefly from the title—viz. "Of the Interpretation of Nature."

Now it seems to me that this argument proves too much. For I find the same title given to another unfinished work—the *Temporis Partus Masculus*—of which we happen to know that it was meant to be in three books; the first to be entitled *Perpolitio et applicatio mentis;* the second, *Lumen Naturæ, seu formula Interpretationis;* the third, *Natura illuminata, sive Veritas Rerum.* The first would have corresponded therefore to the first book of the *Novum Organum;* the second, being a statement of the new method, to the second and remaining books; the third, being a statement of the application of the new method, to the sixth and last part of the Instauratio. It would seem from this that when Bacon designed the *Temporis Partus Masculus,* he had conceived the idea of a work embracing the entire field of the Instauratio, (the first part only excepted), though less fully developed and differently distributed. And I see no sufficient reason for supposing that the design of the *Valerius Terminus* was less extensive.

3. "The *Temporis Partus Masculus* published by Gruter" is spoken of as probably or possibly "the same as the *Temporis Partus Maximus* mentioned by Bacon in his letter to Fulgenzio," and if so, the earliest of all his writings.

Now the writing or rather collection of writings here alluded to is that published not by Gruter but by M. Bouillet; in whose edition of the "Œuvres Philosophiques" the title *Temporis Partus Masculus* is prefixed to four distinct pieces. 1. A short prayer. 2. A fragment headed *Aphorismi et Consilia de auxiliis mentis et accensione luminis naturalis.* 3. A short piece entitled *De Interpretatione Naturæ sententiæ duodecim.* 4. A fragment in two chapters headed *Tradendi modus legitimus.* It is true that from the manner in which M. Bouillet has printed them, any one would suppose that he had Gruter's authority for collecting them all under the same general title. But it is not so. In Gruter's *Scripta philosophica* the title *Temporis Partus Masculus* appears in connexion with the first, and the first only. The last has indeed an undoubted claim to it upon

other and better authority. But I can find no authority whatever for giving it to the other two. If therefore the resemblance of the names be thought a sufficient reason for identifying the *Partus Masculus* with the *Partus Maximus*, that identity must be understood as belonging to the first and fourth only. The grounds of that opinion and of my own dissent from it will be discussed in the proper place. With regard to the argument now in hand, —(viz. whether Bacon, when he wrote the *Temporis Partus Masculus*, had yet thought of producing a great work like the Instauratio)— it is enough perhaps to observe that at whatever period or periods of his life these four pieces were composed, they all belong to the second part of the Instauratio; not as prefaces or prospectuses, but as portions of the work itself; and that if none of them contain any allusion to the other parts, the same may be said of the first book of the *Novum Organum* itself; and therefore that we cannot be warranted in concluding from that fact that the plan of the Instauratio had not yet been conceived.

4. It is assumed that the work which Bacon contemplated when he wrote the *De Interpretatione Naturæ Proœmium* would not have contained the new method and its results (these being, according to his then intention, to be communicated only to chosen followers), but merely the general views of science which form the subject of the first book of the *Novum Organum*.

This seems to be gathered from what he says in the Proœmium concerning the manner in which the several parts of the work were to be published: "Publicandi autem ista ratio ea est, ut quæ ad ingeniorum correspondentias captandas et mentium areas purgandas pertinent, edantur in vulgus et per ora volitent: *reliqua per manus tradantur cum electione et judicio:*" the "reliqua" being, as appears a little further on, "ipsa Interpretationis formula et inventa per eandem:" from which it seems to be inferred that the exposition of the new method was not only not to be *published* along with the rest of the work, but to be excluded from it altogether;—to be kept as a secret, and transmitted *orally*. The grounds of this opinion I shall examine more particularly in a subsequent note with reference to another question. The question with which we are now dealing is only whether at that time Bacon can be supposed to have "thought of producing a great work like the Instauratio:" upon which I will only say that as an intention not to *publish* does not imply an intention not to *write*, so neither does an intention to write imply an intention to publish. And since there is nothing in the *Partis secundæ Delineatio* from which we can infer that even then he intended to *publish* the whole, I do not see how we can infer that the design of *composing* a great work like the Instauratio had been conceived in the interval between the writing of these two pieces. For as in the

one case he may not have intended to publish what we know he did intend to write, so in the other he may have intended to write what we know he did not intend to publish. And indeed though the Proœmium stands in Gruter's volume by itself and we cannot know to which of Bacon's projected works on the Interpretation of Nature it was meant to be prefixed, there is none which it seems to fit so well as the *Temporis Partus Masculus*. Now the *Temporis Partus Masculus*, as we know from the titles of the three books above quoted, *was* to contain both the *formula Interpretationis* and the *inventa per eandem*.

All these points will be considered more at large when I come to state the grounds upon which I have assigned to each tract its place in this edition. In the meantime I am unwilling to let any conclusion of importance appear to rest upon them; and in the present case all inferences which are in any way dependent upon the assumptions which I have noticed as questionable may I think be freely dispensed with. That to bring in a new method of Induction was Bacon's central idea and original design, and that the idea of an *Instauratio Magna* came after, may in the absence of all evidence to the contrary be safely enough inferred from his own words in the *Advancement of Learning*; where after reporting a deficiency of the first magnitude in that department of knowledge which concerns the invention of sciences,—a deficiency proved by the barrenness and accounted for by the viciousness and incompetency of the *method of induction then in use*,—he adds, "This part of Invention, concerning the Invention of Sciences, I purpose, if God give me leave, hereafter to propound; having digested into two parts; whereof the one I term *Experientia Literata*, and the other *Interpretatio Naturæ*[1]; the former being but a degree and rudiment of the latter. But I will not dwell too long nor speak too great upon a promise." This "Interpretatio Naturæ" can have been nothing else therefore than a new method of induction to supply the place of the vicious and incompetent method then in use; and since among all the reported "deficiencies" this is the only one which he himself proposes to supply,—for of the others he merely gives specimens to make his meaning clear,—we may, I think, safely conclude that this and no other was the great work which he was meditating when he wrote the *Advancement of Learning*. His expressions moreover seem to imply that this work was already begun and in progress; and seeing that the *Valerius Terminus* answers the description both in title and (so far as the first book goes, which is all we know of it) in contents also, why may we not suppose that it was a commencement or a sketch of the very work

[1] The corresponding passage in the *De Augmentis* calls it "Interpretatio Naturæ *sive Novum Organum*."

he speaks of, and that of the fragment which has been preserved part was written before and part after? a supposition probable enough in itself, and by which at least one difficulty, which I shall mention hereafter[1], is effectually removed.

As an additional reason for thinking that the idea of the Instauratio Magna was of later date than that of a work on the Interpretation of Nature, I may observe that the *name* Instauratio does not occur in any of Bacon's letters earlier than 1609. The earliest of his compositions in which it appears was probably the *Partis Instaurationis secundæ Delineatio et Argumentum;* but of this the date cannot be fixed with any certainty; and as Gruter is our only authority for it, and the word Instauratio appears in the title only, not in the body of the work, we cannot even be sure that it was originally there. If Gruter found a manuscript headed "Partis secundæ Delineatio, &c.," and evidently referring to the parts of the Instauratio Magna, he was likely enough to insert the word silently by way of explanation.

Note B.

The question is, how far, by what means, and with what motive, Bacon at one time wished to keep his system secret.

Let us first compare all the passages in which such an intention appears to be intimated, or such a practice alluded to; taking them in chronological order, as far as our knowledge of the dates of his various writings enables us to do so. These which follow are all that I have been able to find.

1. *Valerius Terminus.* Ch. 18.

"That the discretion anciently observed, though by the precedent of many vain persons and deceivers abused, of publishing part and reserving part to a private succession, and of publishing in such a manner whereby it may not be to the taste or capacity of all, *but shall as it were single and adopt his reader,* is not to be laid aside; both for the avoiding of abuse in the excluded, and the strengthening of affection in the admitted."

And again (Ch. 11.), "To ascend further by scale I do forbear, partly because it would draw on the example to an over-great length, but chiefly because it would open that *which in this work I determine to reserve.*"

2. *Advancement of Learning.*

"And as Alexander Borgia was wont to say of the expedition of the French for Naples, that they came with chalk in their hands to

[1] See my note at the end of Mr. Ellis's Preface to the *Valerius Terminus.*

mark up their lodgings, and not with weapons to fight; so I like better that entry of truth which cometh peaceably with chalk *to mark up those minds which are capable to lodge and harbour it,* than that which cometh with pugnacity and contention."

3. *Advancement of Learning.*

"Another diversity of method there is," [he is speaking of the different methods of "tradition," i. e. of communicating and transmitting knowledge] which hath some affinity with the former, used in some cases by the discretion of the ancients, but disgraced since by the impostures of many vain persons, who have made it as a false light for their counterfeit merchandises; and that is, *enigmatical* and *disclosed.* The pretence whereof [that is, of the enigmatical method] is to *remove the vulgar capacities* from being admitted to the secrets of knowledges, and to *reserve them to selected auditors,* or wits of such sharpness as can pierce the veil."

4. *Proœmium de Interpretatione Naturæ.*

"Publicandi autem ista ratio ea est, ut quæ ad ingeniorum correspondentias captandas et mentium areas purgandas pertinent, edantur in vulgus et per ora volitent; reliqua *per manus tradantur cum electione et judicio.* Nec me latet usitatum et tritum esse impostorum artificium, ut quædam a vulgo secernant nihilo iis ineptiis quas vulgo propinant meliora. Sed ego sine omni impostura, ex providentiâ sanâ prospicio, ipsam interpretationis formulam et inventa per eandem, *intra legitima et optata ingenia clausa,* vegetiora et munitiora futura."

5. *De Interpretatione Naturæ Sententiæ* XII.
De moribus Interpretis.

"Sit etiam in scientiâ quam adeptus est nec occultandâ nec proferendâ vanus, sed ingenuus et prudens: tradatque inventa non ambitiosè aut malignè, sed modo primum maxime vivaci et vegeto, id est ad injurias temporis munitissimo, et ad scientiam propagandam fortissimo, deinde ad errores pariendos innocentissimo, et ante omnia *qui sibi legitimum lectorem seponat.*"

6. *Temporis Partus Masculus.* C. 1.

"An tu censes cum omnes omnium mentium aditus ac meatus obscurissimis idolis, iisdemque alte hærentibus et inustis, obsessi et obstructi sint, veris Rerum et nativis radiis sinceras et politas areas adesse? Nova invenienda est ratio quâ mentibus obductissimis illabi possimus. Ut enim phreneticorum deliramenta arte et ingenio subvertuntur, vi et contentione efferantur, omnino ita in hâc universali insaniâ mos gerendus est. Quid? leviores illæ conditiones, quæ ad

legitimum scientiæ tradendæ modum pertinent, an tibi tam expeditæ et faciles videntur? ut modus innocens sit; id est nulli prorsus errori ansam et occasionem præbeat? ut vim quandam insitam et innatam habeat tum ad fidem conciliandam, tum ad pellendas injurias temporis, adeo ut scientia ita tradita, veluti planta vivax et vegeta, quotidie serpat et adolescat? ut *idoneum et legitimum sibi lectorem seponat et quasi adoptet?*

7. *Cogitata et visa.*

"Itaque de re non modo perficiendâ sed et communicandâ et tradendâ (quâ par est curâ) cogitationem suscipiendam esse. Reperit autem homines in rerum scientiâ quam sibi videntur adepti, interdum proferendâ interdum occultandâ, famæ et ostentationi servire: quin et eos potissimum qui minus solida proponunt solere ea quæ adferunt obscurâ et ambiguâ luce venditare, ut facilius vanitati suæ velificare possint. Putare autem se id tractare quod ambitione aliquâ aut affectatione polluere minime dignum sit; sed tamen necessario eo decurrendum esse (nisi forte rerum et animorum valde imperitus esset, et prorsus inexplorato viam inire vellet) ut satis meminerit, inveteratos semper errores, tanquam phreneticorum deliramenta, arte et ingenio subverti, vi et contentione efferari. Itaque prudentiâ et morigeratione quâdam utendum (quanta cum simplicitate et candore conjungi potest) ut contradictiones ante extinguentur quam excitentur. . . . . Venit ei itaque in mentem posse aliquid simplicius proponi, quod *in vulgus non editum*, saltem tamen ad rei tam salutaris abortum arcendum satis fortasse esse possit. Ad hunc finem parare se de naturâ opus quod errores minimâ asperitate destruere, et ad hominum mentes non turbide accedere possit; quod et facilius fore, quod non se pro duce gesturus, sed ex naturâ lucem præbiturus et sparsurus sit, ut duce postea non sit opus."

8. *Redargutio Philosophiarum* (the beginning of the *Pars secunda*, following the *Delineatio.*)

"Omnem violentiam (ut jam ab initio professi sumus) abesse volumus: atque quod Borgia facetè de Caroli octavi expeditione in Italiam dixit; Gallos venisse in manibus cretam tenentes quâ diversoria notarent, non arma quibus perrumperent; similem quoque inventorum nostrorum et rationem et successum animo præcipimus; nimirum ut potius *animos hominum capaces et idoneos seponere et subire possint*, quam contra sentientibus molesta sint."

9. *Novum Organum.* I. 35.

"Dixit Borgia de expeditione Gallorum in Italiam, eos venisse cum cretâ in manibus, ut diversoria notarent, non cum armis, ut perrumperent: Itidem et nostra ratio est; ut doctrina nostra *animos*

idoneos et capaces subintret; confutationum enim nullus est usus, ubi de principiis et ipsis notionibus atque etiam de formis demonstrationum dissentimus."

10. *De Augmentis Scientiarum.* VI. 2.

"Sequitur aliud methodi discrimen, priori [methodo ad filios, etc.], intentione affine, reipsâ fere contrarium. Hoc enim habet utraque methodus commune, ut *vulgus auditorum a selectis separet;* illud oppositum, quod prior introducit modum tradendi solito apertiorem; altera, de quâ jam dicemus, occultiorem. Sit igitur discrimen tale, ut altera methodus sit exoterica, altera acroamatica. Etenim quam antiqui adhibuerunt præcipue in edendis libris differentiam, eam nos transferimus ad ipsum modum tradendi. Quin etiam acroamatica ipsa apud veteres in usu fuit, atque prudenter et cum judicio adhibita. At acroamaticum sive ænigmaticum istud dicendi genus posterioribus temporibus dehonestatum est a plurimis, qui eo tanquam lumine ambiguo et fallaci abusi sunt ad merces suas adulterinas extrudendas. Intentio autem ejus ea esse videtur, *ut traditionis involucris vulgus (profanum scilicet) a secretis scientiarum summoveatur; atque illi tantum admittantur qui aut per manus magistrorum parabolarum interpretationem nacti sunt, aut proprio ingenii acumine et subtilitate intra velum penetrare possint.*"

These are all the passages I have been able to find, in which the advantage of keeping certain parts of knowledge reserved to a select audience is alluded to. And the question is whether the reserve which Bacon contemplated can be justly compared with that practised by the alchemists and others, who concealed their discoveries as "treasures of which the value would be decreased if others were allowed to share in it."

Now I would observe in the first place that though the expression "single and adopt his reader," or its equivalent, occurs in all these passages, and that too in immediate reference to the method of delivery or transmission, yet in many of them the object of so singling and adopting the reader was certainly *not* to keep the knowledge secret; for many, indeed most, of them relate to that part of the subject which Bacon never proposed to reserve, but which was designed "edi in vulgus et per ora volitare." The part which he proposed to reserve is distinctly defined in the fourth extract as "ipsa interpretationis formula et inventa per eandem;" the part to be published is "ea quæ ad ingeniorum correspondentias captandas et mentium areas purgandas pertinent." Now it is unquestionably to this latter part that the second, the eighth, and the ninth extracts refer. "Primo enim," he says, in the *Partis secundæ Delineatio,* "mentis area æquanda et liberanda ab eis quæ hactenus recepta sunt."

This he calls *Pars destruens;* and proposes to begin with the *Redargutio Philosophiarum,* from the introduction to which the eighth extract is taken. And the other two must of course be classed with it. Thus the "animi capaces et idonei" which he wishes "seponere et subire," are clearly identified with the minds marked up with chalk as capable of lodging and harbouring the truth, which are spoken of in the *Advancement.*

Next to the *Pars destruens* came the *Pars præparans,* the object of which was to prepare men's expectations for what was coming, and by dislodging erroneous preconceptions to make their minds ready for the reception of the truth. To this part belongs the seventh extract; and if the seventh, then the sixth, which evidently corresponds to it; and if the sixth, then the fifth, which is but the sixth condensed. Or if there be any doubt about the correspondence between the seventh and sixth, it will I think be removed by comparing them both with the following passage which winds up the description of the *Pars præparans* in the *Partis secundæ Delineatio.*

"Quod si cui supervacua videatur accurata ista nostra quam adhibemus ad mentes præparandas diligentia, atque cogitet hoc quiddam esse ex pompâ et in ostentationem compositum; itaque cupiat rem ipsam missis ambagibus et præstructionibus simpliciter exhiberi; certe optabilis nobis foret (si vera esset) hujusmodi insimulatio. Utinam enim tam proclive nobis esset difficultates et impedimenta vincere quam fastum inanem et falsum apparatum deponere. Verum hoc velimus homines existiment, nos haud inexplorato viam in tantâ solitudine inire, præsertim cum argumentum hujusmodi præ manibus habeamus quod tractandi imperitiâ perdere et veluti exponere nefas sit. Itaque ex perpenso et perspecto tam rerum quam animorum statu, duriores fere aditus ad hominum mentes quam ad res ipsas invenimus, ac tradendi labores inveniendi laboribus haud multo leviores experimur, atque, quod in intellectualibus res nova fere est, morem gerimus, et tam nostras cogitationes quam aliorum simul bajulamus. Omne enim idolum vanum arte atque obsequio ac debito accessu subvertitur, vi et contentione atque incursione subitâ et abruptâ efferatur. . . . . Quâ in re accedit et alia quædam difficultas ex moribus nostris non parva, quod constantissimo decreto nobis ipsi sancivimus, ut candorem nostrum et simplicitatem perpetuo retineamus, nec per vana ad vera aditum quæramus; sed ita obsequio nostro moderemur ut tamen non per artificium aliquod vafrum aut imposturam aut aliquid simile imposturæ, sed tantummodo per ordinis lumen et novorum super saniorem partem veterum sollertem insitionem, nos nostrorum votorum compotes fore speremus."

Now all this was to precede and prepare for the exposition of the method of induction itself—the "formula ipsa interpretationis"—which alone it was proposed to reserve; and therefore we must

understand the *legitimus lector* of the fifth and sixth extract, as corresponding with the "*animus capax et idoneus*" of the eighth and ninth; and with the mind "chalked and marked up" by truth as "capable to lodge and harbour it," of the second; and we must not suppose that the process of singling and adopting the fit reader was to be effected by any restraint in communication, or any obscurity in style, which should exclude others; but by presenting the truth in such a shape as should be least likely to shock prejudice or awaken contradiction, and most likely to win its way into those minds which were best disposed to receive it. The object was to propagate knowledge so that it should grow and spread: the difficulty anticipated was not in excluding auditors, but in finding them.[1]

Thus I conceive that six out of the ten passages under consideration must be set aside as not bearing at all upon the question at issue. Of the four that remain, two must be set aside in like manner, because though they directly allude to the practice of transmitting knowledge as a secret from hand to hand, they contain no evidence that Bacon approved of it. These are the third and the last, and come respectively from the *Advancement of Learning*, one of his earliest works, and from the *De Augmentis Scientiarum*, one of his latest. In both these works the object being to show in what departments the stock of knowledge then existing was defective, the various methods which have been or may be adopted for the transmission of knowledge are pointed out as a fit subject of inquiry, and the secret or enigmatical or acroamatic method is described among the rest; but it is described only, not recommended.

There remain therefore only the first and the fourth extracts to be considered: and it is true that in both of these Bacon intimates an intention to reserve the communication of one part of his philosophy — the "formula ipsa interpretationis et inventa per eandem" — to certain fit and chosen persons. May we infer from the expressions which he there uses, that his object was to prevent it from becoming generally known, as being a treasure which would lose its value by being divulged? Such a supposition seems to me inconsistent not only with all we know of his proceedings, purposes, and aspirations, but with the very explanation with which he himself accompanies the suggestion. The fruits which he anticipated from his philosophy were not only intended for the benefit of all mankind, but were to be

[1] It may be worth while perhaps to compare with these passages an expression which Bacon uses in his letter to Dr. Playfere,—proposing to him to translate the *Advancement of Learning* into Latin; where a similar meaning is conveyed under another image. "Wherefore since I have only taken upon me to ring a bell to call other wits together, which is the meanest office, it cannot but be consonant to my desire to have that bell heard as far as can be. And since they are but sparks which can work but upon matter prepared, I have the more reason to wish that those sparks may fly abroad, *that they may the better find and light upon those minds and spirits that are apt to be kindled.*"

gathered in another generation. Is it conceivable that at any time of his life he would have willingly foregone the aid of any single fellow labourer, or that anything could have been more welcome than the prospect of a rapid and indefinite increase of those "legitima et optata ingenia" in whose hands it might be expected to thrive and spread? But setting general probabilities aside, let us look at the reasons which he himself assigns for the precaution which he meditates. Ask why in *Valerius Terminus* he proposes to reserve part of his discovery to "a private succession?" His answer is, first "for the *prevention of abuse* in the excluded;" that is, because if it should fall into incapable and unfit hands it will be misused and mismanaged: secondly, "for the *strengthening of affection* in the admitted;" that is, because the fit and capable will take more interest in the work when they feel that it is committed to their charge. Ask again why in the *Proœmium* he proposes to keep the Formula of interpretation private,—"intra legitima et optata ingenia clausa?" The answer is to the same effect—it will be "vegetior et munitior;" it will flourish better and be kept safer. And certainly if we refer to any of the many passages in which he has either enumerated the obstructions which had hitherto hindered the progress of knowledge, or described the qualifications, moral and intellectual, and the order of proceeding, which he considered necessary for the successful prosecution of the new philosophy, we may easily understand why he anticipated more hindrance than help from a popular audience.

Upon a review of the evidence therefore I see no reason to suspect that he had any other motive for his proposed reserve than that which he himself assigns; and I think we may conclude that he meant to withhold the publication of his Formula, not "as a secret of too much value to be lightly revealed," but as a subject too abstruse to be handled successfully except by the fit and few.

Note C.

On some changes in Bacon's treatment of his doctrine of Idols.

"When the doctrine of Idols" (says Mr. Ellis) "was thrown into its present form" [i. e. the form in which it appears in the *Novum Organum*, as contrasted with that in which it appears in the *Partis secundæ Delineatio*], "it ceased to afford a convenient basis for the *pars destruens*, and accordingly the substance of the three *Redargutiones* is in the *Novum Organum* less systematically set forth than

Bacon purposed that it should be when he wrote the *Partis secundæ Delineatio.*"

That the argument is set forth in the *Novum Organum* less systematically than Bacon originally intended, is no doubt true; for when he wrote the "Partis secundæ *Delineatio* et *Argumentum*," he meant to handle the subject regularly and completely, or (as he would himself have expressed it) "in Corpore tractatus justi;" and this in the entrance of the *Novum Organum*, which is the "Pars secunda" itself, we are expressly warned not to expect. "Sequitur secunda pars Instaurationis, quæ artem ipsam interpretandi Naturam et verioris adoperationis Intellectûs exhibet: *neque eam ipsam tamen in Corpore tractatûs justi;* sed tantùm *digestam per summas, in Aphorismos.*" A succession of aphorisms, not formally connected with each other, was probably the most convenient form for setting forth all that was most important in those parts of his work which he had ready; for without binding him to exhibit them in regular and apparent connexion, it left him at liberty to make the connexion as perfect and apparent as he pleased. But it has one disadvantage: the divisions between aphorism and aphorism tend to conceal from the eye the larger divisions between subject and subject. And hence arises the appearance (for I think it is only an appearance) of a deviation from the plan originally marked out for the treatment of the *pars destruens.* Between the publication of the *Advancement of Learning* and the composition of the *Novum Organum*, the doctrine of Idols underwent one considerable modification; but not, I think, the one here supposed. That modification was introduced *before* the *Partis secundæ Delineatio* was drawn up; and after that I cannot find evidence of any substantial change.

I will first exhibit the successive aspects which the doctrine assumes, and then give what I suppose to be the true history of them.

In the *Advancement of Learning*, the Idols, native and adventitious, of the human mind are distributed into three kinds; not distinguished as yet by names, but corresponding respectively to those of the Tribe, the Cave, and the Market-place. In *Valerius Terminus*, they are distributed into four kinds; the Tribe, the Palace (corresponding with the Market-place), the Cave, and the Theatre. In the *Partis secundæ Delineatio* they are distributed again into three, but classified quite differently. The two great divisions of Adventitious and Native are retained: "aut adscititia sunt ... nimirum quæ immigrârunt in mentem, &c., aut ea quæ menti ipsi et substantiæ ejus inhærentia sunt et innata;" but the subdivisions are entirely changed;—the Adventitious being here divided into two kinds, neither of which is recognised at all in the *Advancement;* the Native, which are divided into two kinds in the *Advancement*, not being

divided at all here, but classed together as one. In the *Advancement* we find nothing corresponding to the Idols of the Theatre, to which belong *both* the kinds of adventitious Idols mentioned in the *Delineatio*—those derived *ex philosophorum placitis*, and those derived *ex perversis legibus demonstrationum;*—in the *Delineatio* we find nothing corresponding to the Idols of the Market-place, which among those mentioned in the *Advancement* are alone entitled to be classed as adventitious. Thus the difference between the two appears at first to be total and radical, amounting to an entire rearrangement of all the classes. Instead of Idols of the Tribe, the Cave, and the Market-place, we find Idols of the Philosophies, the Demonstrations, and the Human Mind.

But the truth is that Bacon, being now engaged in laying out the large outlines of his subject, omits the minor distinctions which belong to the development of it in detail, and leaves the particular distribution and description of those "fallacies and false appearances" which are "inseparable from our nature and condition in life"—those namely which he had spoken of in the *Advancement*—to be handled in the work itself. Having however, as he came into closer contact with his subject, foreseen the opposition which he must expect from prejudices and false appearances of another kind—prejudices which had no root in the mind itself, which were *not* "inseparable from our nature and condition in life,"—mere immigrants and strangers that had come in and might be turned out,—namely, the belief in received systems and attachment to received methods of demonstration,—he had resolved to deal with these first; and therefore introduces them as a separate class, dividing them into two parts and assigning to each what we may call a separate chapter. These he afterwards called Idols of the Theatre, and treated them in the manner proposed; with this difference only—that he placed them last instead of first, and ran the two chapters into one.

This being allowed, it will be found that the one substantial change which the doctrine of Idols underwent was the admission of these Idola Theatri into the company, and that there is no real difference between the form of that doctrine as indicated in the *Delineatio* and as developed in the *Novum Organum*.

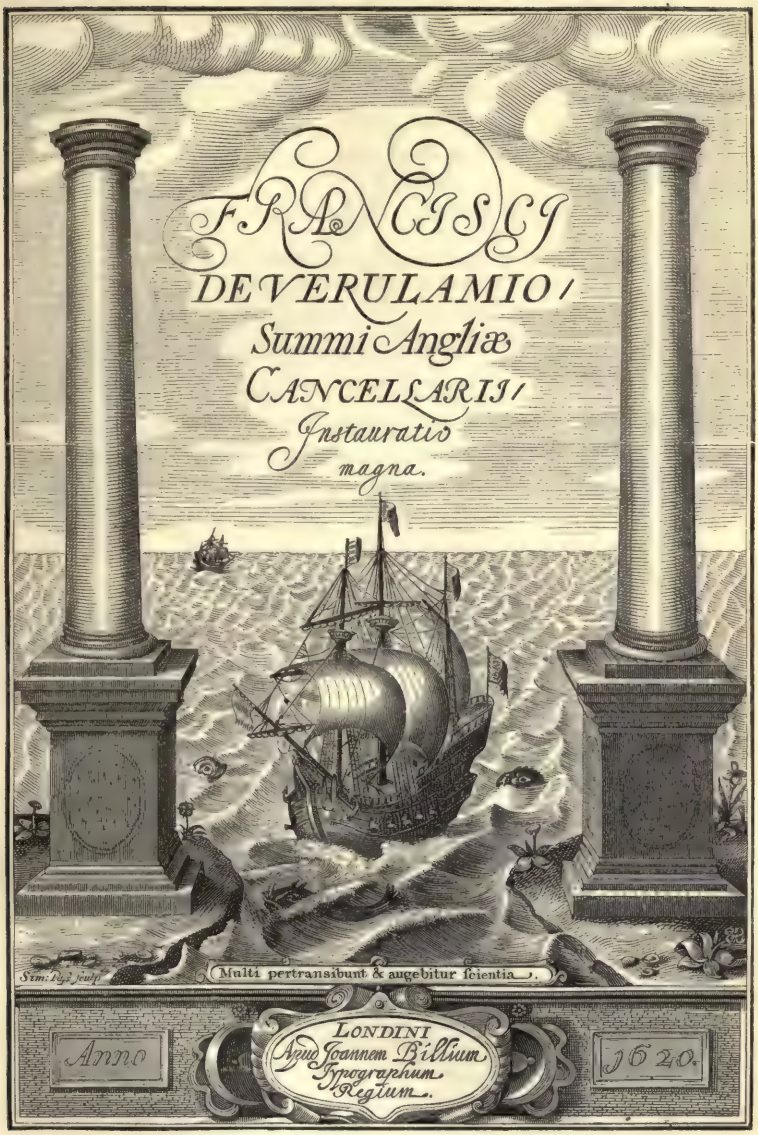
The only difficulty which this view of the subject presents is one which may be probably enough accounted for as an oversight of Bacon's own. I mean the classification of the Idola Fori, the source of which is no doubt extraneous, among the natives. Bacon was never very careful about subtle logical distinctions, and in this case his attention had not as yet been specially called to the point. For in the *Advancement of Learning*, though the great division between Native and Adventitious appears to be recognised in the margin, there is no hint of it in the text,—the particular Idols not being

arranged with any reference to those two general heads; while in *Valerius Terminus* the larger division is not alluded to at all, and the order in which the four Idols are there enumerated,—the first and third being of one class, the second and fourth of the other,—seems to prove that no such classification was then in his mind. Besides, it is to be remembered that the Idola Fori, however distinct in their origin, are in their nature and qualities much nearer akin to the other two than to the Idola Theatri. For though they come from without, yet when they are once in they naturalise themselves and take up their abode along with the natives, produce as much confusion, and can as hardly be expelled. Philosophical systems may be exploded, false methods of demonstration may be discarded, but intercourse of words is "inseparable from our condition in life."

At any rate, let the logical error implied be as large as it may, it is certain that Bacon did in fact always class these three together. Wherever he mentions the Idols of the Market-place with any reference to classification, they are grouped with those of the Tribe and the Cave, and distinguished from those of the Theatre. In the *Temporis Partus Masculus*, c. 2. (which is I think the earliest form of the *Redargutio Philosophiarum* though probably of later date than the *Delineatio*) we find "Nam Idola quisque sua (*non* jam *scenæ* dico, sed præcipue *fori et specûs*"), &c. In the *De Augmentis Scientiarum* where the four kinds of Idols are enumerated by name and in order, the line of separation is drawn not between the two first and the two last (as it would have been if Bacon had meant to balance the members of his classification on the "dichotomising principle," as suggested by Mr. Ellis, p. 91.), but between the three first and the fourth; the Idola Fori being classed along with the Idola Tribûs and Specûs, as "quæ plane obsident mentem, neque evelli possunt," the Idola Theatri being broadly distinguished from them, as "quæ abnegari possunt et deponi," and which may therefore for the present be set aside. In the *Novum Organum* itself, though the divisions between aphorism and aphorism tend, as I have said, to obscure the divisions of subject, yet if we look carefully we shall see that the line of demarcation is drawn exactly in the same place, and almost as distinctly. For after speaking of the *three* first kinds of Idol, Bacon proceeds (Aph. 61.), "At Idola *Theatri* innata non sunt [like those of the Tribe and Cave] *nec occulto insinuata in Intellectum* [like those of the Market-place], sed ex fabulis theoriarum et perversis legibus demonstrationum plane indita et recepta." Lastly, in the *Distributio Operis*, where the particular Idols are not mentioned by name, but the more general classification of the *Delineatio* is retained, it is plain that under the class *Adscititia* he meant to include the Idols of the Theatre only—("adscititia vero immigrârunt in mentes hominum, vel ex philosophorum placitis et sectis, vel ex perversis legibus

demonstrationum") — and therefore he must still have meant to include the Idols of the Market-place, along with the two first, under the class *Innata.*

It is worthy of remark however that, in the *Novum Organum* itself, the distinction between Adscititia and Innata disappears. And the fact probably is that when he came to describe the several Idols one by one, he became aware both of the logical inconsistency of classing the Idola Fori among the Innata, and of the practical inconvenience of classing them among the Adscititia, and therefore resolved to drop the dichotomy altogether and range them in four co-ordinate classes. And it is the removal of this boundary line which makes it *seem* at first sight as if the arrangement were quite changed, whereas it is in fact only inverted. According to the plan of the *Partis secundæ Delineatio* and also of the *Distributio Operis*, the confutation of the Immigrants,—that is, the *Redargutio Philosophiarum* and *Redargutio Demonstrationum*,—was to have the precedence, and the confutation of the Natives,—that is, the *Redargutio Rationis humanæ nativæ*,—was to follow. As it is, he begins with the last and ends with the first. And the reason of this change of plan is not difficult to divine. The *Redargutio Philosophiarum*, as he handles it, traverses a wider and more various field, and rises gradually into a strain of prophetic anticipation, after which the *Redargutio Rationis* would have sounded flat.


FRANCISCI
DE VERULAMIO,
Summi Angliæ
CANCELLARII,
Instauratio
magna.
Sim: Pass sculp
Multi pertransibunt & augebitur scientia.
Anno
LONDINI
Apud Joannem Billium
Typographum
Regium.
1620.

FRANCISCUS DE VERULAMIO

SIC COGITAVIT;

TALEMQUE APUD SE RATIONEM INSTITUIT,

QUAM VIVENTIBUS ET POSTERIS NOTAM FIERI IPSORUM INTERESSE PUTAVIT.

Cum illi pro comperto esset intellectum humanum sibi ipsi negotium facessere, neque auxiliis veris (quæ in hominis potestate sunt) uti sobrie et commode; unde multiplex rerum ignoratio et ex ignoratione rerum detrimenta innumera: omni ope connitendum existimavit, si quo modo commercium istud Mentis et Rerum (cui vix aliquid in terris, aut saltem in terrenis, se ostendit simile) restitui posset in integrum, aut saltem in melius deduci. Ut vero errores qui invaluerunt, quique in æternum invalituri sunt, alii post alios (si mens sibi permittatur) ipsi se corrigerent, vel ex vi intellectus propria vel ex auxiliis atque adminiculis dialecticæ, nulla prorsus suberat spes; propterea quod notiones rerum primæ, quas mens haustu facili et supino excipit recondit atque accumulat (unde reliqua omnia fluunt), vitiosæ sint et confusæ et temere a rebus abstractæ; neque minor sit in secundis et reliquis libido et inconstantia; ex quo fit, ut universa ista ratio humana, qua utimur quoad inquisitionem naturæ, non bene congesta et ædificata sit, sed tanquam moles aliqua magnifica sine fundamento. Dum enim falsas mentis vires mirantur homines et celebrant, veras ejusdem quæ esse possint (si debita ei adhibeantur auxilia, atque ipsa rebus morigera sit, nec impotenter rebus insultet) prætereunt et perdunt. Restabat illud unum ut res de integro tentetur melioribus præsidiis, utque fiat scientiarum et artium atque omnis humanæ doctrinæ in universum Instauratio, a debitis excitata fundamentis. Hoc vero licet aggressu infinitum quiddam videri possit ac supra vires mortales, tamen idem tractatu sanum invenietur ac sobrium, magis quam ea quæ adhuc facta sunt. Exitus enim hujus rei est nonnullus. In iis vero quæ jam fiunt circa scientias, est vertigo quædam et agitatio perpetua et circulus. Neque eum

fugit quanta in solitudine versetur hoc experimentum, et quam durum et incredibile sit ad faciendam fidem. Nihilominus, nec rem nec seipsum deserendum putavit, quin viam quæ una humanæ menti pervia est tentaret atque iniret. Præstat enim principium dare rei quæ exitum habere possit, quam in iis quæ exitum nullum habent perpetua contentione et studio implicari. Viæ autem contemplativæ viis illis activis decantatis fere respondent; ut altera, ab initio ardua et difficilis, desinat in apertum; altera, primo intuitu expedita et proclivis, ducat in avia et præcipitia. Quum autem incertus esset quando hæc alicui posthac in mentem ventura sint; eo potissimum usus argumento, quod neminem hactenus invenit qui ad similes cogitationes animum applicuerit; decrevit prima quæque quæ perficere licuit in publicum edere. Neque hæc festinatio ambitiosa fuit, sed sollicita; ut si quid illi humanitus accideret, extaret tamen designatio quædam ac destinatio rei quam animo complexus est; utque extaret simul signum aliquod honestæ suæ et propensæ in generis humani commoda voluntatis. Certe aliam quamcunque ambitionem inferiorem duxit re quam præ manibus habuit. Aut enim hoc quod agitur nihil est, aut tantum, ut merito ipso contentum esse debeat nec fructum extra quærere.

SERENISSIMO

POTENTISSIMOQUE PRINCIPI AC DOMINO NOSTRO,

JACOBO,

DEI GRATIA

MAGNÆ BRITANNIÆ, FRANCIÆ, ET HIBERNIÆ REGI,

FIDEI DEFENSORI, ETC.

Serenissime Potentissimeque Rex,

POTERIT fortasse Majestas tua me furti incusare, quod tantum temporis quantum ad hæc sufficiat negotiis tuis suffuratus sim. Non habeo quod dicam. Temporis enim non fit restitutio; nisi forte quod detractum fuerit temporis rebus tuis, id memoriæ nominis tui et honori sæculi tui reponi possit; si modo hæc alicujus sint pretii. Sunt certe prorsus nova; etiam toto genere: sed descripta ex veteri admodum exemplari, mundo scilicet ipso, et natura rerum et mentis. Ipse certe (ut ingenue fatear) soleo æstimare hoc opus magis pro partu temporis quam ingenii. Illud enim in eo solummodo mirabile est, initia rei et tantas de iis quæ invaluerunt suspiciones alicui in mentem venire potuisse. Cætera non illibenter sequuntur. At versatur proculdubio casus (ut loquimur) et quiddam quasi fortuitum non minus in iis quæ cogitant homines quam in iis quæ agunt aut loquuntur. Verum hunc casum (de quo loquor) ita intelligi volo, ut si quid in his quæ affero sit boni, id immensæ misericordiæ et bonitati divinæ et fœlicitati temporum tuorum tribuatur: cui et vivus integerrimo affectu servivi, et mortuus fortasse id effecero, ut illa posteritati, nova hac accensa face in

philosophiæ tenebris, prælucere possint. Merito autem temporibus regis omnium sapientissimi et doctissimi Regeneratio ista et Instauratio scientiarum debetur. Superest petitio, Majestate tua non indigna, et maxime omnium faciens ad id quod agitur. Ea est, ut quando Salomonem in plurimis referas, judiciorum gravitate, regno pacifico, cordis latitudine, librorum denique quos composuisti nobili varietate, etiam hoc ad ejusdem regis exemplum addas, ut cures Historiam Naturalem et Experimentalem, veram et severam (missis philologicis), et quæ sit in ordine ad condendam philosophiam, denique qualem suo loco describemus, congeri et perfici: ut tandem post tot mundi ætates philosophia et scientiæ non sint amplius pensiles et aëreæ, sed solidis experientiæ omnigenæ, ejusdemque bene pensitatæ, nitantur fundamentis. Equidem Organum præbui; verum materies a rebus ipsis petenda est.

Deus Opt. Max. Majestatem tuam
diu servet incolumem.

Serenissimæ Majestati tuæ

Servus devinctissimus,

et devotissimus,

FRANCISCUS VERULAM,
CANCELLARIUS.

FRANCISCI DE VERULAMIO

INSTAURATIO MAGNA.

PRÆFATIO.

De statu scientiarum, quod non sit fœlix aut majorem in modum auctus; quodque alia omnino quam prioribus cognita fuerit via aperienda sit intellectui humano, et alia comparanda auxilia, ut mens suo jure in rerum naturam uti possit.

VIDENTUR nobis homines nec opes nec vires suas bene nosse; verum de illis majora quam par est, de his minora credere. Ita fit, ut aut artes receptas insanis pretiis æstimantes nil amplius quærant, aut seipsos plus æquo contemnentes vires suas in levioribus consumant, in iis quæ ad summam rei faciant non experiantur. Quare sunt et suæ scientiis columnæ tanquam fatales; cum ad ulterius penetrandum homines nec desiderio nec spe excitentur. Atque cum opinio copiæ inter maximas causas inopiæ sit; quumque ex fiducia præsentium vera auxilia negligantur in posterum; ex usu est, et plane ex necessitate, ut ab illis quæ adhuc inventa sunt in ipso operis nostri limine (idque relictis ambagibus et non dissimulanter) honoris et admirationis excessus tollatur; utili monito, ne homines eorum aut copiam aut utilitatem in majus accipiant[1] aut celebrent. Nam si quis in omnem illam librorum varietatem qua artes et scientiæ exultant diligentius introspiciat, ubique inveniet ejusdem rei repetitiones infinitas, tractandi modis diversas, inventione præoccupatas[2]; ut omnia primo intuitu numerosa, facto examine pauca reperiantur. Et de utilitate aperte dicendum est, sapientiam istam quam a Græcis potissimum hausimus pueritiam quandam scientiæ videri, atque habere quod proprium est puerorum, ut ad garriendum prompta, ad gene-

[1] Exaggerate.

[2] Anticipated, so far as relates to originality of invention. (One of Bacon's antitheses between "inventione" and "modis tractandi.")

randum invalida et immatura sit. Controversiarum enim ferax, operum effœta est. Adeo ut fabula illa de Scylla in literarum statum, qualis habetur, ad vivum quadrare videatur; quæ virginis os et vultum extulit, ad uterum vero monstra latrantia succingebantur et adhærebant. Ita habent et scientiæ quibus insuevimus generalia quædam blandientia et speciosa, sed cum ad particularia ventum sit, veluti ad partes generationis, ut fructum et opera ex se edant, tum contentiones et oblatrantes disputationes exoriuntur, in quas desinunt, et quæ partus locum obtinent. Præterea, si hujusmodi scientiæ plane res mortua non essent, id minime videtur eventurum fuisse quod per multa jam sæcula usu venit, ut illæ suis immotæ fere hæreant vestigiis, nec incrementa genere humano digna sumant: eo usque, ut sæpenumero non solum assertio maneat assertio sed etiam quæstio maneat quæstio, et per disputationes non solvatur sed figatur et alatur, omnisque traditio et successio disciplinarum repræsentet et exhibeat personas magistri et auditoris, non inventoris et ejus qui inventis aliquid eximium adjiciat. In artibus autem mechanicis contrarium evenire videmus; quæ, ac si auræ cujusdam vitalis forent participes, quotidie crescunt et perficiuntur, et in primis authoribus rudes plerunque et fere onerosæ et informes apparent, postea vero novas virtutes et commoditatem quandam adipiscuntur, eo usque, ut citius studia hominum et cupiditates deficiant et mutentur, quam illæ ad culmen et perfectionem suam pervenerint. Philosophia contra et scientiæ intellectuales, statuarum more, adorantur et celebrantur, sed non promoventur. Quin etiam in primo nonnunquam authore maxime vigent, et deinceps degenerant. Nam postquam homines deditii facti sint et in unius sententiam (tanquam pedarii senatores) coierint, scientiis ipsis amplitudinem non addunt, sed in certis authoribus ornandis et stipandis servili officio funguntur. Neque illud afferat quispiam, scientias paullatim succrescentes tandem ad statum quendam pervenisse, et tum demum (quasi confectis spatiis legitimis) in operibus paucorum sedes fixas posuisse; atque postquam nil melius inveniri potuerit, restare scilicet ut quæ inventa sint exornentur et colantur. Atque optandum quidem esset hæc ita se habuisse. Rectius illud et verius, istas scientiarum mancipationes nil aliud esse quam rem ex paucorum hominum confidentia et reliquorum socordia et inertia natam. Postquam enim scientiæ per partes diligenter fortasse excultæ et tractatæ fuerint, tum forte exortus est aliquis, ingenio audax et propter methodi compendia acce-

ptus et celebratus, qui specie tenus artem constituerit, revera veterum labores corruperit. Id tamen posteris gratum esse solet, propter usum operis expeditum et inquisitionis novæ tædium et impatientiam. Quod si quis consensu jam inveterato tanquam temporis judicio moveatur, sciat se ratione admodum fallaci et infirma niti. Neque enim nobis magna ex parte notum est, quid in scientiis et artibus, variis sæculis et locis, innotuerit et in publicum emanarit; multo minus, quid a singulis tentatum sit et secreto agitatum. Itaque nec temporis partus nec abortus extant in fastis. Neque ipse consensus ejusque diuturnitas magni prorsus æstimandus est. Utcunque enim varia sint genera politiarum, unicus est status scientiarum, isque semper fuit et mansurus est popularis. Atque apud populum plurimum vigent doctrinæ aut contentiosæ et pugnaces aut speciosæ et inanes, quales videlicet assensum aut illaqueant aut demulcent. Itaque maxima ingenia proculdubio per singulas ætates vim passa sunt; dum viri captu et intellectu non vulgares, nihilo secius existimationi suæ consulentes, temporis et multitudinis judicio se submiserint. Quamobrem altiores contemplationes si forte usquam emicuerint, opinionum vulgarium ventis subinde agitatæ sunt et extinctæ. Adeo ut Tempus, tanquam fluvius, levia et inflata ad nos devexerit, gravia et solida demerserit. Quin et illi ipsi authores qui dictaturam quandam in scientiis invaserunt et tanta confidentia de rebus pronuntiant, cum tamen per intervalla ad se redeunt, ad querimonias de subtilitate naturæ, veritatis recessibus, rerum obscuritate, causarum implicatione, ingenii humani infirmitate, se convertunt; in hoc nihilo tamen modestiores, cum malint communem hominum et rerum conditionem causari quam de seipsis confiteri. Quin illis hoc fere solenne est, ut quicquid ars aliqua non attingat id ipsum ex eadem arte impossibile esse statuant. Neque vero damnari potest ars, quum ipsa disceptet et judicet. Itaque id agitur, ut ignorantia etiam ab ignominia liberetur. Atque quæ tradita et recepta sunt ad hunc fere modum se habent: quoad opera sterilia, quæstionum plena; incrementis suis tarda et languida; perfectionem in toto simulantia, sed per partes male impleta; delectu autem popularia et authoribus ipsis suspecta, ideoque artificiis quibusdam munita et ostentata.[1] Qui autem et ipsi experiri et se scientiis addere

[1] So selected as to favour popular notions, while at the same time their truth is doubted even by those who propound them, on which account they are fenced round and set forth with sundry artifices.

earumque fines proferre statuerunt, nec illi a receptis prorsus desciscere ausi sunt, nec fontes rerum petere. Verum se magnum quiddam consequuntos putant si aliquid ex proprio inserant et adjiciant; prudenter secum reputantes, se in assentiendo modestiam, in adjiciendo libertatem tueri posse. Verum dum opinionibus et moribus consulitur, mediocritates istæ laudatæ in magnum scientiarum detrimentum cedunt. Vix enim datur authores simul et admirari et superare. Sed fit aquarum more, quæ non altius ascendunt quam ex quo descenderunt. Itaque hujusmodi homines emendant nonnulla sed parum promovent, et proficiunt in melius non in majus. Neque tamen defuerunt, qui ausu majore omnia integra sibi duxerunt, et ingenii impetu usi, priora prosternendo et destruendo aditum sibi et placitis suis fecerunt; quorum tumultu non magnopere profectum est; quum philosophiam et artes non re ac opere amplificare, sed placita tantum permutare atque regnum opinionum in se transferre contenderint; exiguo sane fructu, quum inter errores oppositos errandi causæ sint fere communes. Si qui autem nec alienis nec propriis placitis obnoxii, sed libertati faventes, ita animati fuere ut alios secum simul quærere cuperent; illi sane affectu honesti, sed conatu invalidi fuerunt. Probabiles enim tantum rationes secuti videntur, et argumentorum vertigine circumaguntur, et promiscua quærendi licentia severitatem inquisitionis enervarunt. Nemo autem reperitur, qui in rebus ipsis et experientia moram fecerit legitimam. Atque nonnulli rursus qui experientiæ undis se commisere et fere mechanici facti sunt, tamen in ipsa experientia erraticam quandam inquisitionem exercent, nec ei[1] certâ lege militant. Quin et plerique pusilla quædam pensa sibi proposuere, pro magno ducentes si unum aliquod inventum eruere possint; instituto non minus tenui, quam imperito. Nemo enim rei alicujus naturam in ipsa re recte aut fœliciter perscrutatur; verum post laboriosam experimentorum variationem non acquiescit, sed invenit quod ulterius quærat. Neque illud imprimis omittendum est, quod omnis in experiendo industria statim ab initio opera quædam destinata præpropero et intempestivo studio captavit; fructifera (inquam) experimenta, non lucifera, quæsivit; nec ordinem divinum imitata est, qui primo die lucem[2] tantum creavit, eique

[1] In its service.

[2] The light created on the first day is by many divines supposed to be not a corporeal but a spiritual light. This is the doctrine of S. Augustine; who however does not say that those who adopt a contrary opinion are necessarily wrong. This idea of

unum diem integrum attribuit; neque illo die quicquam materiati operis produxit, verum sequentibus diebus ad ea descendit. At qui summas dialecticæ partes tribuerunt atque inde fidissima scientiis præsidia comparari putarunt, verissime et optime viderunt intellectum humanum sibi permissum merito suspectum esse debere. Verum infirmior omnino est malo medicina; nec ipsa mali expers. Siquidem dialectica quæ recepta est, licet ad civilia et artes quæ in sermone et opinione positæ sunt rectissime adhibeatur, naturæ tamen subtilitatem longo intervallo non attingit; et prensando quod non capit, ad errores potius stabiliendos et quasi figendos quam ad viam veritati aperiendam valuit.

Quare, ut quæ dicta sunt complectamur, non videtur hominibus aut aliena fides aut industria propria circa scientias hactenus fœliciter illuxisse; præsertim quum et in demonstrationibus et in experimentis adhuc cognitis parum sit præsidii. Ædificium autem hujus universi structura sua, intellectui humano contemplanti, instar labyrinthi est; ubi tot ambigua viarum, tam fallaces rerum et signorum similitudines, tam obliquæ et implexæ naturarum spiræ et nodi, undequaque se ostendunt. Iter autem sub incerto sensus lumine, interdum affulgente interdum se condente, per experientiæ et rerum particularium sylvas perpetuo faciendum est. Quin etiam duces itineris (ut dictum est) qui se offerunt, et ipsi implicantur, atque errorum et errantium numerum augent. In rebus tam duris, de judicio hominum ex vi propria, aut etiam de fœlicitate fortuita, desperandum est. Neque enim ingeniorum quantacunque excellentia, neque experiendi alea sæpius repetita, ista vincere queat. Vestigia filo regenda sunt: omnisque via, usque a primis ipsis sensuum perceptionibus, certa ratione munienda. Neque hæc ita accipienda sunt, ac si nihil omnino tot sæculis, tantis laboribus, actum sit. Neque enim eorum quæ inventa sunt nos pœnitet. Atque antiqui certe, in iis quæ in ingenio et meditatione abstracta posita sunt, mirabiles se viros præstitere. Verum quemadmodum sæculis prioribus, cum homines in navigando per stellarum tantum observationes cursum dirigebant, veteris sane continentis oras legere potuerunt, aut maria aliqua minora et mediterranea trajicere; priusquam autem oceanus trajiceretur et novi orbis regiones detegerentur, ne-

a spiritual light was developed at great length in connexion with the theory of the nature and cognition of angels.

cesse fuit usum acus nauticæ, ut ducem viæ magis fidum et certum, innotuisse: simili prorsus ratione, quæ hucusque in artibus et scientiis inventa sunt, ea hujusmodi sunt ut usu, meditatione, observando, argumentando, reperiri potuerint; utpote quæ sensibus propiora sint et communibus notionibus fere subjaceant; antequam vero ad remotiora et occultiora naturæ liceat appellere, necessario requiritur ut melior et perfectior mentis et intellectus humani usus et adoperatio introducatur.

Nos certe, æterno veritatis amore devicti, viarum incertis et arduis et solitudinibus nos commisimus; et divino auxilio freti et innixi, mentem nostram et contra opinionum violentias et quasi instructas acies, et contra proprias et internas hæsitationes et scrupulos, et contra rerum caligines et nubes et undequaque volantes phantasias, sustinuimus; ut tandem magis fida et secura indicia viventibus et posteris comparare possemus. Qua in re si quid profecerimus, non alia sane ratio nobis viam aperuit quam vera et legitima spiritus humani humiliatio. Omnes enim ante nos, qui ad artes inveniendas se applicuerunt, conjectis paulisper in res et exempla et experientiam oculis, statim, quasi inventio nil aliud esset quam quædam excogitatio, spiritus proprios ut sibi oracula exhiberent quodammodo invocarunt. Nos vero inter res caste et perpetuo versantes, intellectum longius a rebus non abstrahimus quam ut rerum imagines et radii (ut in sensu fit) coire possint[1]; unde fit, ut ingenii viribus et excellentiæ non multum relinquatur. Atque quam in inveniendo adhibemus humilitatem, eandem et in docendo sequuti sumus. Neque enim aut confutationum triumphis, aut

[1] To explain the illustration of which Bacon here makes use, it is in the first place to be remarked that *radius* is not to be rendered by *ray*, but by *visual cone*. "Radium visualem speciem rei visibilis dicimus: non ut lineam aut superficiem mathematicam profundo carentem, sed corporalem et pyramidalem, cujus basis in re visâ et conus in oculo videntis est."—Marg. Phil. x. 2. c. 11. Again Telesius, whose theory of vision was adopted by Bacon, says, "quæ a re quæ spectatur relucet lux universa quidem unum in pupillâ coit in punctum," thus forming the "radius" just mentioned. Lastly Telesius goes on to say, "ab illarum [rerum sc.] puncto quovis illa [lux sc.] relucet, et vel ubi in unum coit punctum universa ibi fit, itaque et rerum a quibus relucet imagines et ipsæ [sic enim legendum] in eodem fiunt puncto." These "imagines" then are therefore in some unexplained manner borne along by the light which constitutes the visual cone, and exist virtually if not formally at the apex from which the light dispersing in an inverse cone falls ultimately (still bearing them with it) on the vitreous humour, which is in this system the sphere of vision. Bacon's expressions therefore amount simply to this, that the eye must be at a certain distance from the object in order that an effectual visual cone may be formed. He does not speak either of optical images or of rays, in the senses which we attach to those words. See *Telesius, De Rerum Naturâ*, vi. c. 23 and 24.

antiquitatis advocationibus, aut authoritatis usurpatione quadam, aut etiam obscuritatis velo, aliquam his nostris inventis majestatem imponere aut conciliare conamur; qualia reperire non difficile esset ei, qui nomini suo non animis aliorum lumen affundere conaretur. Non (inquam) ullam aut vim aut insidias hominum judiciis fecimus aut paramus; verum eos ad res ipsas et rerum fœdera adducimus; ut ipsi videant quid habeant, quid arguant, quid addant atque in commune conferant. Nos autem si qua in re vel male credidimus, vel obdormivimus et minus attendimus, vel defecimus in via et inquisitionem abrupimus, nihilominus iis modis res nudas et apertas exhibemus, ut errores nostri, antequam scientiæ massam altius inficiant, notari et separari possint; atque etiam ut facilis et expedita sit laborum nostrorum continuatio. Atque hoc modo inter empiricam et rationalem facultatem (quarum morosa et inauspicata divortia et repudia omnia in humana familia turbavere) conjugium verum et legitimum in perpetuum nos firmasse existimamus.[1]

Quamobrem, quum hæc arbitrii nostri non sint, in principio operis, ad Deum Patrem, Deum Verbum, Deum Spiritum, preces fundimus humillimas et ardentissimas, ut humani generis ærumnarum memores et peregrinationis istius vitæ in qua dies paucos et malos terimus, novis suis eleemosynis, per manus nostras, familiam humanam dotare dignentur. Atque illud insuper supplices rogamus, ne humana divinis officiant, neve ex reseratione viarum sensus et accensione majore luminis naturalis aliquid incredulitatis et noctis animis nostris erga divina mysteria oboriatur: sed potius, ut ab intellectu puro, a phantasiis et vanitate repurgato et divinis oraculis nihilominus subdito et prorsus dedititio, fidei dentur quæ fidei sunt. Postremo, ut scientiæ veneno a serpente infuso, quo animus humanus tumet et inflatur, deposito, nec altum sapiamus nec ultra sobrium, sed veritatem in charitate colamus.

Peractis autem votis, ad homines conversi, quædam et salutaria monemus et æqua postulamus. Monemus primum (quod etiam precati sumus) ut homines sensum in officio, quoad divina, contineant. Sensus enim (instar solis) globi terrestris faciem aperit, cœlestis claudit et obsignat.[2] Rursus, ne hujusce mali

[1] This is one of the passages which show that Bacon did not imagine that the empirical faculty was the only thing to be considered in the philosophy of science, but that he recognised another coordinate element.

[2] This image, which in the *Advancement of Learning* and in the *De Augmentis* Bacon quotes from "one of Plato's school," is taken from Philo Judæus, perhaps the

fuga in contrarium peccent; quod certe fiet, si naturæ inquisitionem ulla ex parte veluti interdicto separatam putant. Neque enim pura illa et immaculata scientia naturalis, per quam Adam nomina ex proprietate rebus imposuit, principium aut occasionem lapsui dedit. Sed ambitiosa illa et imperativa scientiæ moralis, de bono et malo dijudicantis, cupiditas, ad hoc ut Homo a Deo deficeret et sibi ipsi leges daret, ea demum ratio atque modus tentationis fuit. De scientiis autem quæ naturam contemplantur sanctus ille philosophus pronuntiat, *Gloriam Dei esse celare rem; gloriam regis autem rem invenire:* non aliter ac si divina natura innocenti et benevolo puerorum ludo delectaretur, qui ideo se abscondunt ut inveniantur; atque animam humanam sibi collusorem in hoc ludo pro sua in homines indulgentia et bonitate cooptaverit. Postremo omnes in universum monitos volumus, ut scientiæ veros fines cogitent; nec eam aut animi causa petant, aut ad contentionem, aut ut alios despiciant, aut ad commodum, aut ad famam, aut ad potentiam, aut hujusmodi inferiora; sed ad meritum et usus vitæ; eamque in charitate perficiant et regant. Ex appetitu enim potentiæ angeli lapsi sunt; ex appetitu scientiæ, homines; sed charitatis non est excessus; neque angelus aut homo per eam unquam in periculum venit.

Postulata autem nostra quæ afferimus talia sunt. De nobis ipsis silemus: de re autem quæ agitur petimus, ut homines eam non opinionem sed opus esse cogitent; ac pro certo habeant, non sectæ nos alicujus aut placiti, sed utilitatis et amplitudinis humanæ fundamenta moliri. Deinde ut suis commodis æqui, exutis opinionum zelis et præjudiciis, in commune consulant; ac ab erroribus viarum atque impedimentis, nostris præsidiis et auxiliis, liberati et muniti, laborum qui restant et ipsi in partem

most poetical of the Neo-Platonists. "Post exortum ejus [solis scilicet] illustrantur in terris omnia, in cœlo vero celantur; e diverso, post ejus occasum sidera quidem promicant, terrestria vero cuncta obteguntur umbris supervenientibus: ad eundem modum res nostræ se habent; quoties sensuum splendor tanquam sol oritur, tunc scientiæ reverâ cœlestes occultantur: quoties autem ad occasum accedit, tunc fulgentissimæ virtutum stellæ se proferunt, quando etiam mens ipsa re nullâ velante fit sensibilis."—*Philo Jud., Quod somnia mittantur a Deo.* (I quote from the version of Gelenius.)

Nearly the same idea appears to be expressed in the *Bhagavad Gita*, ii. 69.:

Welche jedem Geschöpf Nacht ist, in der wacht der Gesammelte;
In der jeglich Geschöpf wachet, ist des schauenden Weisen Nacht.
S. W. v. Humboldt's Works, i. 34.

Which might be thus rendered in the Latin of the middle ages: —

In nocte creaturæ vigilat internus homo;
Cum autem vigilat creatura, contemplativo nox est.

veniant. Præterea, ut bene sperent; neque *Instaurationem* nostram, ut quiddam infinitum et ultra mortale, fingant et animo concipiant; quum revera sit infiniti erroris finis et terminus legitimus; mortalitatis autem et humanitatis non sit immemor; quum rem non intra unius ætatis curriculum omnino perfici posse confidat, sed successioni destinet; denique scientias, non per arrogantiam in humani ingenii cellulis, sed submisse in mundo majore quærat. Vasta vero ut plurimum solent esse, quæ inania: solida contrahuntur maxime, et in parvo sita sunt. Postremo etiam petendum videtur (ne forte quis rei ipsius periculo nobis iniquus esse velit) ut videant homines, quatenus ex eo quod nobis asserere necesse sit (si modo nobis ipsi constare velimus) de his nostris opinandi aut sententiam ferendi sibi jus permissum putent: quum nos omnem istam rationem humanam præmaturam, anticipantem, et a rebus temere et citius quam oportuit abstractam, (quatenus ad inquisitionem naturæ) ut rem variam et perturbatam et male extructam rejiciamus. Neque postulandum est ut ejus judicio stetur, quæ ipsa in judicium vocatur.

DISTRIBUTIO OPERIS.

Ejus constituuntur Partes sex.

Prima; *Partitiones Scientiarum.*
Secunda; *Novum Organum,* sive *Indicia de Interpretatione Naturæ.*
Tertia; *Phænomena Universi,* sive *Historia Naturalis et Experimentalis ad condendam Philosophiam.*
Quarta; *Scala Intellectus.*
Quinta; *Prodromi,* sive *Anticipationes Philosophiæ Secundæ.*
Sexta; *Philosophia Secunda,* sive *Scientia Activa.*

Singularum Argumenta.

Pars autem instituti nostri est, ut omnia, quantum fieri potest, aperte et perspicue proponantur. Nuditas enim animi, ut olim corporis, innocentiæ et simplicitatis comes est. Pateat itaque primo, ordo operis atque ratio ejus. Partes operis a nobis constituuntur sex.

Prima pars exhibet scientiæ ejus sive doctrinæ in cujus possessione humanum genus hactenus versatur, Summam, sive descriptionem universalem. Visum enim est nobis etiam in iis quæ recepta sunt nonnullam facere moram: eo nimirum consilio, ut facilius et veteribus perfectio et novis aditus detur. Pari enim fere studio ferimur et ad vetera excolenda et ad ulteriora assequenda. Pertinet etiam hoc ad faciendam fidem: juxta illud, *Non accipit indoctus verba scientiæ, nisi prius ea dixeris quæ versantur in corde ejus.* Itaque scientiarum atque artium receptarum oras legere, necnon utilia quædam in illas importare, tanquam in transitu, non negligemus.

Partitiones tamen Scientiarum adhibemus eas, quæ non tantum jam inventa et nota, sed hactenus omissa et debita, complectantur. Etenim inveniuntur in globo intellectuali, quemadmodum in terrestri, et culta pariter et deserta. Itaque nil mirum videri debet, si a divisionibus usitatis quandoque receda-

mus. Adjectio enim, dum totum variat, etiam partes earumque sectiones necessario variat: receptæ autem divisiones receptæ summæ scientiarum, qualis nunc est, tantum competunt.

Circa ea vero quæ ceu omissa notabimus, ita nos geremus, ut non leves tantum titulos et argumenta concisa eorum quæ desiderantur proponamus. Nam siquid inter omissa retulerimus (modo sit dignioris subjecti) cujus ratio paulo videatur obscurior, adeo ut merito suspicari possimus homines non facile intellecturos quid nobis velimus aut quale sit illud opus quod animo et cogitatione complectimur, perpetuo nobis curæ erit aut præcepta hujusmodi operis conficiendi aut etiam partem operis ipsius jam a nobis confectam ad exemplum totius subjungere; ut in singulis aut opera aut consilio juvemus. Etenim etiam ad nostram existimationem, non solum aliorum utilitatem, pertinere putavimus, ne quis arbitretur levem aliquam de istiusmodi rebus notionem mentem nostram perstrinxisse, atque esse illa quæ desideramus ac prensamus tanquam votis similia. Ea vero talia sunt, quorum et penes homines (nisi sibi ipsi desint) potestas plane sit, et nos apud nosmet rationem quandam certam et explicatam habeamus. Neque enim regiones metiri animo, ut augures, auspiciorum causa: sed intrare, ut duces, promerendi studio[1], suscepimus. *Atque hæc prima operis pars est.*

Porro prætervecti artes veteres, intellectum humanum ad trajiciendum instruemus. Destinatur itaque parti secundæ, doctrina de meliore et perfectiore usu rationis in rerum inquisitione, et de auxiliis veris intellectus: ut per hoc (quantum conditio humanitatis ac mortalitatis patitur) exaltetur intellectus, et facultate amplificetur ad naturæ ardua et obscura superanda. Atque est ea quam adducimus ars (quam *Interpretationem Naturæ* appellare consuevimus) ex genere logicæ; licet plurimum, atque adeo immensum quiddam, intersit. Nam et ipsa illa logica vulgaris auxilia et præsidia intellectui moliri ac parare pro tetur: et in hoc uno consentiunt. Differt autem plane a vulgari rebus præcipue tribus: viz. ipso fine, ordine demonstrandi, et inquirendi initiis.

Nam huic nostræ scientiæ finis proponitur, ut inveniantur non argumenta sed artes, nec principiis consentanea sed ipsa principia, nec rationes probabiles sed designationes et indica-

[1] Purposing to deserve well of their country.

tiones Operum. Itaque ex intentione diversa diversus sequitur effectus. Illic enim adversarius disputatione vincitur et constringitur, hic natura opere.

Atque cum hujusmodi fine conveniunt demonstrationum ipsarum natura et ordo. In logica enim vulgari opera fere universa circa Syllogismum consumitur. De Inductione vero Dialectici vix serio cogitasse videntur; levi mentione eam transmittentes, et ad disputandi formulas properantes. At nos demonstrationem per syllogismum rejicimus, quod confusius agat, et naturam emittat e manibus. Tametsi enim nemini dubium esse possit quin, quæ in medio termino conveniunt, ea et inter se conveniant (quod est mathematicæ cujusdam certitudinis): nihilominus hoc subest fraudis, quod syllogismus ex propositionibus constet, propositiones ex verbis, verba autem notionum tesseræ et signa sint. Itaque si notiones ipsæ mentis (quæ verborum quasi anima sunt, et totius hujusmodi structuræ ac fabricæ basis) male ac temere a rebus abstractæ, et vagæ, nec satis definitæ et circumscriptæ, denique multis modis vitiosæ fuerint, omnia ruunt. Rejicimus igitur syllogismum; neque id solum quoad principia (ad quæ nec illi eam adhibent) sed etiam quoad propositiones medias, quas educit sane atque parturit utcunque syllogismus, sed operum steriles et a practica remotas et plane quoad partem activam scientiarum incompetentes. Quamvis igitur relinquamus syllogismo et hujusmodi demonstrationibus famosis ac jactatis jurisdictionem in artes populares et opinabiles (nil enim in hac parte movemus), tamen ad naturam rerum Inductione per omnia, et tam ad minores propositiones quam ad majores, utimur. *Inductionem* enim censemus eam esse demonstrandi formam, quæ sensum tuetur et naturam premit et operibus imminet ac fere immiscetur.

Itaque ordo quoque demonstrandi plane invertitur. Adhuc enim res ita geri consuevit; ut a sensu et particularibus primo loco ad maxime generalia advoletur, tanquam ad polos fixos circa quos disputationes vertantur; ab illis cætera per media deriventur: via certe compendiaria, sed præcipiti, et ad naturam impervia, ad disputationes vero proclivi et accommodata. At secundum nos, axiomata[1] continenter et gradatim excitan-

[1] Bacon's way of using the word "axioma" as if it were equivalent to "enuntiatum" or "propositio" he derived from Peter Ramus. Hasse, an early commentator on Ramus, remarks that the word is used in the same way by Cicero, who probably took it from the Stoics.

tur, ut nonnisi postremo loco ad generalissima veniatur: ea vero generalissima evadunt non notionalia, sed bene terminata, et talia quæ natura ut revera sibi notiora agnoscat[1], quæque rebus hæreant in medullis.

At in forma ipsa quoque inductionis, et judicio quod per eam fit, opus longe maximum movemus. Ea enim de qua dialectici loquuntur, quæ procedit per enumerationem simplicem, puerile quiddam est, et precario concludit, et periculo ab instantia contradictoria exponitur, et consueta tantum intuetur, nec exitum reperit.

Atqui opus est ad scientias inductionis forma tali, quæ experientiam solvat et separet, et per exclusiones ac rejectiones debitas necessario concludat. Quod si judicium illud vulgatum dialecticorum tam operosum fuerit, et tanta ingenia exercuerit; quanto magis laborandum est in hoc altero, quod non tantum ex mentis penetralibus, sed etiam ex naturæ visceribus extrahitur?

Neque tamen hic finis. Nam fundamenta quoque scientiarum fortius deprimimus et solidamus, atque initia inquirendi altius sumimus, quam adhuc homines fecerunt: ea subjiciendo examini, quæ logica vulgaris tanquam fide aliena recipit. Etenim dialectici principia scintiarum a scientiis singulis tanquam mut uo sumunt: rursus, notiones mentis primas venerantur: postremo, informationibus immediatis sensus bene dispositi acquiescunt. At nos logicam veram singulas scientiarum provincias majore cum imperio quam penes ipsarum principia sit debere ingredi decrevimus, atque illa ipsa principia putativa ad rationes reddendas compellere quousque plane constent.[2] Quod vero

[1] Aristotle everywhere distinguishes between that which is prior and more known in the order of nature, and that which is prior and more known with respect to ourselves. Thus in the *Posterior Analytics*, i. 2., he says: "Priora autem et notiora dupliciter dicuntur: neque enim idem est prius naturâ et prius quantum ad nos pertinet; neque idem quod notius naturâ et quod nobis notius. Dico enim, quantum ad nos, et priora et notiora esse quæ a sensu propius; per se vero ac simpliciter, et priora et notiora quæ longius absunt; quo quid autem magis universale eo est remotius, ac singula quæque sunt proxima." The schoolmen, misled by the ambiguity of the Greek dative, substitute for "notius naturâ," τῇ φύσει γνωριμώτερον, "notius naturæ," as if Aristotle had spoken of Nature's knowledge in opposition to ours. The phrase in the text involves the same metaphor. It may be translated "Such as Nature would recognise as being really her first principles." "Notius naturâ" is equivalent to St. Thomas's expression "prius per viam perfectionis." See with respect to the subject of this note, and especially to the origin and meaning of the phrases à priori and à posteriori, *Trendelenburg Elementa Log. Aristot.* 81.

Bartholdy's rendering is merely founded in error: "dass es die Natur für einen wirklichen Beweis einer innigern Bekanntschaft mit ihr anerkennen muss."

[2] On the relation of philosophy to the sciences, I may refer to an interesting essay by Ritter in the *Berlin Transactions.*

attinet ad notiones primas intellectus; nihil est eorum quæ intellectus sibi permissus congessit, quin nobis pro suspecto sit, nec ullo modo ratum, nisi novo judicio se stiterit et secundum illud pronuntiatum fuerit. Quinetiam sensus ipsius informationes multis modis excutimus. Sensus enim fallunt utique, sed et errores suos indicant: verum errores præsto, indicia eorum longe petita sunt.

Duplex autem est sensus culpa: aut enim destituit nos aut decipit. Nam primo, plurimæ sunt res quæ sensum etiam recte dispositum nec ullo modo impeditum effugiunt; aut subtilitate totius corporis, aut partium minutiis, aut loci distantia, aut tarditate atque etiam velocitate motus, aut familiaritate objecti, aut alias ob causas. Neque rursus, ubi sensus rem tenet, prehensiones ejus admodum firmæ sunt. Nam testimonium et informatio sensus semper est ex analogia hominis, non ex analogia universi[1]: atque magno prorsus errore asseritur, sensum esse mensuram rerum.

Itaque ut his occurratur, nos multo et fido ministerio auxilia sensui undique conquisivimus et contraximus, ut destitutionibus substitutiones, variationibus rectificationes suppeditentur. Neque id molimur tam instrumentis quam experimentis. Etenim experimentorum longe major est subtilitas quam sensus ipsius, licet instrumentis exquisitis adjuti; (de iis loquimur experimentis, quæ ad intentionem ejus quod quæritur perite et secundum artem excogitata et apposita sunt.)[2] Itaque perceptioni sensus immediatæ ac propriæ non multum tribuimus: sed eo rem deducimus, ut sensus tantum de experimento, experimentum de re judicet. Quare existimamus nos sensus (a quo omnia in

[1] The phrase "est ex analogiâ" is to be rendered (giving to "analogia" a wider signification than that which it ordinarily has) by "has reference to:" just as in the dictum, "materia non est cognoscibilis nisi ex analogiâ (or per analogiam) formæ;"—"except by reference to form." It seems not improbable that this way of using the word was suggested by the passage in the *Physics* which gave rise to the dictum I have quoted. Aristotle says, *Phys.* i. 7., "Ἡ δὲ ὑποκειμένη φύσις, ἐπιστητὴ κατὰ ἀναλογίαν —in which however the word is really used in its usual sense, since Aristotle goes on to say that this ὑποκειμένη φύσις stands in the same relation to οὐσία that bronze does to a statue, or wood to a couch; thus illustrating the nature of matter by referring to the subject-matter of an artificial form. Bacon elsewhere uses the phrase "in ordine ad" just as he here uses "ex analogiâ;" and on the other hand S. Thomas says, referring to the passage just cited, "Materia non est scibilis nisi *in ordine ad* formam, ut dicit Philosophus primo Physicorum;" so that the two phrases seem equivalent. See S. Thomas, *De Naturâ Materiæ*, c. 2., compared with the tract *De principio individuationis*.

That the meaning of the word Analogy was misconceived by S. Thomas, by Duns Scotus, and by the schoolmen in general, is pointed out by Zabarella, *De prim. rerum materiâ*, i. 4.

[2] [Compare *Nov. Org.* ii. 36.—*J. S.*]

naturalibus petenda sunt, nisi forte libeat insanire) antistites religiosos, et oraculorum ejus non imperitos interpretes, nos præstitisse: ut alii professione quadam, nos re ipsa, sensum tueri ac colere videamur. Atque hujusmodi sunt ea quæ ad lumen ipsum naturæ ejusque accensionem et immissionem paramus: quæ per se sufficere possent, si intellectus humanus æquus et instar tabulæ abrasæ esset. Sed cum mentes hominum miris modis adeo obsessæ sint ut ad veros rerum radios excipiendos sincera et polita area prorsus desit, necessitas quædam incumbit ut etiam huic rei remedium quærendum esse putemus.

Idola autem a quibus occupatur mens, vel Adscititia sunt vel Innata. Adscititia vero immigrarunt in mentes hominum, vel ex philosophorum placitis et sectis vel ex perversis legibus demonstrationum. At Innata inhærent naturæ ipsius intellectus, qui ad errorem longe proclivior esse deprehenditur quam sensus. Utcunque enim homines sibi placeant et in admirationem mentis humanæ ac fere adorationem ruant, illud certissimum est: sicut speculum inæquale rerum radios ex figura et sectione propria immutat, ita et mentem, cum a rebus per sensum patitur, in notionibus suis expediendis et comminiscendis haud optima fide rerum naturæ suam naturam inserere et immiscere.

Atque priora illa duo *Idolorum* genera ægre, postrema vero hæc nullo modo, evelli possunt.[1] Id tantum relinquitur, ut indicentur, atque ut vis ista mentis insidiatrix notetur et convincatur; ne forte a destructione veterum novi subinde errorum surculi ex ipsa mala complexione mentis pullulent, eoque res recidat, ut errores non extinguantur sed permutentur; verum e contra ut illud tandem in æternum ratum et fixum sit, intellectum nisi per inductionem ejusque formam legitimam judicare non posse. Itaque doctrina ista de expurgatione intellectus ut ipse ad veritatem habilis sit, tribus redargutionibus absolvitur: redargutione philosophiarum, redargutione demonstrationum, et redargutione rationis humanæ nativæ.[2] His vero explicatis, ac postquam demum patuerit quid rerum natura,

[1] The *priora duo* are the Idols of the Theatre, which include both kinds. The *postrema hæc* are the Idols of the Tribe, the Cave, and the Market-place. Compare *De Aug. Sci.* v. 4.; and see Note C. at the end of the Preface.—*J. S.*

[2] Compare Aph. 115, where these three *Redargutiones* are enumerated in the inverse order; in which order they are treated. This shows that the *Distributio Operis* was written before Bacon had decided upon the arrangement of the *Novum Organum*. See Note C. at the end of the Preface.—*J. S.*

quid mentis natura ferat, existimamus nos thalamum Mentis et Universi, pronuba divina bonitate, stravisse et ornasse. Epithalamii autem votum sit, ut ex eo connubio auxilia humana et stirps inventorum quæ necessitates ac miserias hominum aliqua ex parte doment et subigant, suscipiatur.[1] *Hæc vero est operis pars secunda.*

At vias non solum monstrare et munire, sed inire quoque consilium est. Itaque tertia pars operis complectitur *Phænomena Universi;* hoc est, omnigenam experientiam, atque historiam naturalem ejus generis quæ possit esse ad condendam philosophiam fundamentalis. Neque enim excellens aliqua demonstrandi via sive naturam interpretandi forma, ut mentem ab errore et lapsu defendere ac sustinere, ita ei materiam ad sciendum præbere et subministrare possit. Verum iis quibus non conjicere et hariolari, sed invenire et scire propositum est, quique non simiolas et fabulas mundorum comminisci, sed hujus ipsius veri mundi naturam introspicere et velut dissecare in animo habent, omnia a rebus ipsis petenda sunt. Neque huic labori et inquisitioni ac mundanæ perambulationi, ulla ingenii aut meditationis aut argumentationis substitutio aut compensatio sufficere potest; non si omnia omnium ingenia coierint. Itaque aut hoc prorsus habendum, aut negotium in perpetuum deserendum. Ad hunc vero usque diem ita cum hominibus actum est, ut minime mirum sit si natura sui copiam non faciat.

Nam primo, sensus ipsius informatio, et deserens et fallens; observatio, indiligens et inæqualis et tanquam fortuita; traditio, vana et ex rumore; practica, operi intenta et servilis; vis experimentalis, cæca, stupida, vaga, et prærupta; denique historia naturalis, levis et inops, vitiosissimam materiam intellectui ad philosophiam et scientias congesserunt.

[1] The received reading is *suscipiatur*, which seems erroneous, but may perhaps be defended. [I have myself very little doubt that Bacon wrote *suscipiatur*, not *suscipiantur*. If it be ever allowable to make a verb which depends upon two nominatives agree with the last only (which I think it sometimes is), there was a reason for doing so in this case; an ambiguity as well as a jingle being thereby avoided. In an earlier form of this passage (which will be found in the *Partis Instaurationis secundæ Delineatio*), the verb is in the singular, as here; though in that place it depends directly upon the plural nominative "auxilia humana," and therefore cannot be defended. In the *Redargutio Philosophiarum* it appears again in still another shape. There we have two nominatives, one singular and one plural, as here; but the plural coming last, the verb is in the plural, "ut ex illo connubio, non phantasiæ monstra, sed stirps heroum, quæ monstra domet et extinguat,—hoc est inventa salutaria et utilia ad necessitates humanas (quantum fieri datur) debellandos et relevandos, suscipiantur. Hoc epithalamii votum sit."—*J. S.*]

Deinde, præpostera argumentandi subtilitas et ventilatio serum rebus plane desperatis tentatur remedium, nec negotium ullo modo restituit aut errores separat. Itaque nulla spes majoris augmenti ac progressus sita est, nisi in restauratione quadam scientiarum.

Hujus autem exordia omnino a naturali historia sumenda sunt, eaque ipsa novi cujusdam generis et apparatus. Frustra enim fuerit speculum expolire, si desint imagines; et plane materia idonea præparanda est intellectui, non solum præsidia fida comparanda. Differt vero rursus historia nostra (quemadmodum logica nostra) ab ea quæ habetur, multis rebus: fine sive officio, ipsa mole et congerie, dein subtilitate, etiam delectu et constitutione in ordine ad ea quæ sequuntur.

Primo enim eam proponimus historiam naturalem, quæ non tam aut rerum varietate delectet aut præsenti experimentorum fructu juvet, quam lucem inventioni causarum affundat, et philosophiæ enutricandæ primam mammam præbeat. Licet enim opera atque activam scientiarum partem præcipue sequamur, tamen messis tempus expectamus, nec muscum et segetem herbidam demetere conamur. Satis enim scimus, axiomata recte inventa tota agmina operum secum trahere, atque opera non sparsim sed confertim exhibere. Intempestivum autem illum et puerilem affectum, ut pignora aliqua novorum operum propere captentur, prorsus damnamus et amovemus, ceu pomum Atalantæ quod cursum retardat. Atque Historiæ nostræ Naturalis officium tale est.

Quoad congeriem vero, conficimus historiam non solum naturæ liberæ ac solutæ (cum scilicet illa sponte fluit et opus suum peragit), qualis est historia cœlestium, meteororum, terræ et maris, mineralium, plantarum, animalium; sed multo magis naturæ constrictæ et vexatæ; nempe, cum per artem et ministerium humanum de statu suo detruditur, atque premitur et fingitur. Itaque omnia artium mechanicarum, omnia operativæ partis liberalium, omnia practicarum complurium quæ in artem propriam non coaluerunt, experimenta (quantum inquirere licuit et quantum ad finem nostrum faciunt) perscribimus. Quin etiam (ut quod res est eloquamur) fastum hominum et speciosa nil morati, multo plus et operæ et præsidii in hac parte quam in illa altera ponimus; quandoquidem natura rerum magis se prodit per vexationes artis quam in libertate propria.

Neque Corporum tantum historiam exhibemus; sed diligentiæ insuper nostræ esse putavimus, etiam Virtutum ipsarum (illarum dicimus quæ tanquam cardinales in natura censeri possint, et in quibus naturæ primordia plane constituuntur, utpote materiæ primis passionibus ac desideriis, viz. *Denso, Raro, Calido, Frigido, Consistenti, Fluido, Gravi, Levi,* aliisque haud paucis) historiam seorsum comparare.[1]

Enimvero ut de subtilitate dicamus, plane conquirimus genus experimentorum longe subtilius et simplicius quam sunt ea quæ occurrunt. Complura enim a tenebris educimus et eruimus, quæ nulli in mentem venisset investigare, nisi qui certo et constanti tramite ad inventionem causarum pergeret; cum in se nullius magnopere sint usus; ut liquido appareat, ea non propter se quæsita esse; sed ita prorsus se habeant illa ad res et opera quemadmodum literæ alphabeti se habeant ad orationem et verba; quæ licet per se inutiles eædem tamen omnis sermonis elementa sunt.

In delectu autem narrationum et experimentorum melius hominibus cavisse nos arbitramur quam qui adhuc in historia naturali versati sunt. Nam omnia fide oculata aut saltem perspecta, et summa quadam cum severitate, recipimus; ita ut nil referatur auctum miraculi causa, sed quæ narramus a fabulis et vanitate casta et intemerata sint. Quinetiam et recepta quæque ac jactata mendacia (quæ mirabili quodam neglectu per sæcula multa obtinuerunt et inveterata sunt) nominatim proscribimus et notamus; ne scientiis amplius molesta sint. Quod enim prudenter animadvertit quidam, fabulas et superstitiones et nugas quas nutriculæ pueris instillant, mentes eorum etiam serio depravare: ita eadem nos movit ratio ut solliciti atque etiam anxii simus ne ab initio, cum veluti infantiam philosophiæ sub historia naturali tractemus et curemus, illa alicui vanitati assuescat. At in omni experimento novo et paulo subtiliore, licet (ut nobis videtur) certo ac probato, modum tamen experimenti quo usi sumus aperte subjungimus; ut, postquam patefactum sit quomodo singula nobis constiterint, videant homines quid erroris subesse et adhærere possit, atque ad probationes magis fidas et magis exquisitas (si quæ sint) expergiscantur: denique ubique monita et scrupulos et

[1] The whole tendency of Bacon's method led him to give the first place to inquiries relating to abstract qualities of the nature of those which he here mentions. We shall have occasion to remark on this point in connexion with several passages in the second book of the *Novum Organum*.

cautiones aspergimus, religione quadam et tanquam exorcismo omnia phantasmata ejicientes ac cohibentes.

Postremo, cum nobis exploratum sit quantopere experientia et historia aciem mentis humanæ disgreget, et quam difficile sit (præsertim animis vel teneris vel præoccupatis) a principio cum natura consuescere, adjungimus sæpius observationes nostras, tanquam primas quasdam conversiones et inclinationes ac veluti aspectus historiæ ad philosophiam; ut et pignoris loco hominibus sint eos in historiæ fluctibus perpetuo non detentos iri, utque cum ad opus intellectus deveniatur omnia sint magis in procinctu. Atque per hujusmodi (qualem describimus) Historiam Naturalem, aditum quendam fieri posse ad naturam tutum et commodum, atque materiam intellectui præberi probam et præparatam, censemus.

Postquam vero et intellectum fidissimis auxiliis ac præsidiis stipavimus, et justum divinorum operum exercitum severissimo delectu comparavimus; nil amplius superesse videtur, nisi ut philosophiam ipsam aggrediamur. Attamen in re tam ardua et suspensa, sunt quædam quæ necessario videntur interponenda; partim docendi gratia, partim in usum præsentem.

Horum primum est, ut exempla proponantur inquirendi et inveniendi secundum nostram rationem ac viam, in aliquibus subjectis repræsentata: sumendo ea potissimum subjecta quæ et inter ea quæ quæruntur sunt nobilissima et inter se maxime diversa; ut in unoquoque genere exemplum non desit. Neque de iis exemplis loquimur quæ singulis præceptis ac regulis illustrandi gratia adjiciuntur (hoc enim in secunda parte operis abunde præstitimus); sed plane typos intelligimus et plasmata, quæ universum mentis processum atque inveniendi continuatam fabricam et ordinem, in certis subjectis, iisque variis et insignibus, tanquam sub oculos ponant. Etenim nobis in mentem venit, in mathematicis, astante machina, sequi demonstrationem facilem et perspicuam; contra absque hac commoditate, omnia videri involuta et quam revera sunt subtiliora. Itaque hujusmodi exemplis quartam partem nostri operis attribuimus: quæ revera nil aliud est, quam secundæ partis applicatio particularis et explicata.

At quinta pars ad tempus tantum, donec reliqua perficiantur, adhibetur; et tanquam fœnus redditur, usque dum sors haberi

possit. Neque enim finem nostrum ita petimus occæcati, ut quæ occurrunt in via utilia negligamus. Quamobrem quintam partem operis ex iis conficimus quæ a nobis aut inventa aut probata aut addita sunt; neque id tamen ex rationibus atque præscriptis interpretandi, sed ex eodem intellectus usu quem alii in inquirendo et inveniendo adhibere consueverunt. Etenim cum, ex perpetua nostra cum natura consuetudine, majora de meditationibus nostris quam pro ingenii viribus speramus; tum poterunt ista veluti tabernaculorum in via positorum vice fungi, ut mens ad certiora contendens in iis paulisper acquiescat. Attamen testamur interim, nos illis ipsis, quod ex vera interpretandi forma non sint inventa aut probata, teneri minime velle. Istam vero judicii suspensionem non est quod exhorreat quispiam, in doctrina quæ non simpliciter nil sciri posse, sed nil nisi certo ordine et certa via sciri posse, asserit; atque interea tamen certos certitudinis gradus ad usum et levamen constituit, donec mens in causarum explicatione consistat. Neque enim illæ ipsæ scholæ philosophorum qui *Acatalepsiam* simpliciter tenuerunt inferiores fuere istis quæ pronuntiandi licentiam usurparunt. Illæ tamen sensui et intellectui auxilia non paraverunt, quod nos fecimus, sed fidem et authoritatem plane sustulerunt; quod longe alia res est, et fere opposita.

Sexta tandem pars operis nostri (cui reliquæ inserviunt ac ministrant) eam demum recludit et proponit philosophiam, quæ ex hujusmodi (qualem ante docuimus et paravimus) inquisitione legitima et casta et severa educitur et constituitur. Hanc vero postremam partem perficere et ad exitum perducere, res est et supra vires et ultra spes nostras collocata. Nos ei initia (ut speramus) non contemnenda, exitum generis humani fortuna dabit, qualem forte homines in hoc rerum et animorum statu haud facile animo capere aut metiri queant. Neque enim agitur solum fœlicitas contemplativa, sed vere res humanæ et fortunæ, atque omnis operum potentia. Homo enim naturæ minister et interpres tantum facit et intelligit, quantum de naturæ ordine, opere vel mente, observaverit: nec amplius scit, aut potest. Neque enim ullæ vires causarum catenam solvere aut perfringere possint, neque natura aliter quam parendo vincitur. Itaque intentiones geminæ illæ, humanæ scilicet *Scientiæ* et *Potentiæ*, vere in idem coincidunt; et frustratio operum maxime fit ex ignoratione causarum.

Atque in eo sunt omnia, siquis oculos mentis a rebus ipsis nunquam dejiciens, earum imagines plane ut sunt excipiat. Neque enim hoc siverit Deus, ut phantasiæ nostræ somnium pro exemplari mundi edamus: sed potius benigne faveat, ut apocalypsim ac veram visionem vestigiorum[1] et sigillorum creatoris super creaturas scribamus.

Itaque Tu Pater, qui lucem visibilem primitias creaturæ dedisti, et lucem intellectualem ad fastigium operum tuorum in faciem hominis inspirasti; opus hoc, quod a tua bonitate profectum tuam gloriam repetit, tuere et rege. Tu postquam conversus es ad spectandum opera quæ fecerunt manus tuæ, vidisti quod omnia essent bona valde; et requievisti. At homo conversus ad opera quæ fecerunt manus suæ, vidit quod omnia essent vanitas et vexatio spiritus; nec ullo modo requievit. Quare si in operibus tuis sudabimus, facies nos visionis tuæ et sabbati tui participes.[2] Supplices petimus, ut hæc mens nobis constet; utque novis eleemosynis, per manus nostras et aliorum quibus eandem mentem largieris, familiam humanam dotatam velis.

[1] This application of the word "vestigia" is constantly made by the schoolmen. Thus St. Thomas Aquinas: "In rationalibus creaturis est imago Trinitatis, in cæteris vero creaturis est *vestigium* Trinitatis, in quantum in eis inveniuntur aliqua quæ reducuntur in divinas personas." — *Summa Theolog.* 1ma pars, q. 45. art. 7.

[2] Compare this with St. Augustine's prayer at the close of the *Confessions*. "Domine Deus pacem da nobis (omnia enim præstitisti nobis), pacem quietis, pacem Sabbati, Sabbati sine vesperâ. Omnis quippe iste ordo pulcherrimus rerum valde bonarum modis suis peractis transiturus est, et mane quippe in eis factum est et vespera. Dies autem septimus sine vesperâ est, nec habet occasum, quia sanctificasti eum ad permansionem sempiternam, ut id quod tu post opera tua bona valde, quamvis ea quietus feceris, requievisti septimo die, hoc præloquatur nobis vox libri tui, quod et nos post opera nostra, ideo bona valde quia tu nobis ea donasti, sabbato vitæ æternæ requiescamus in te." — *Conf.* xiii. 35—6.

Compare also the line with which the *Faerie Queene* breaks off:—

"O that [q. thou?] great Sabbaoth God graunt me that Sabbaoth sight."

DEEST

PARS PRIMA INSTAURATIONIS,

QUÆ COMPLECTITUR

PARTITIONES SCIENTIARUM.

Illæ tamen ex Secundo Libro de Progressibus faciendis in Doctrina Divina et Humana, *nonnulla ex parte peti possunt.*[1]

SEQUITUR

SECUNDA PARS INSTAURATIONIS,

QUÆ ARTEM IPSAM

Interpretandi Naturam, et verioris adoperationis Intellectus exhibet: neque eam ipsam tamen in Corpore tractatus justi, sed tantum digestam per summas, in Aphorismos.[2]

[1] This is omitted in the common editions of Bacon's collected works (in all, I believe, except Montagu's); the *De Augmentis Scientiarum*, with the title "*Instaurationis Magnæ pars prima*" prefixed on a separate leaf, being substituted for it. And it is true that Bacon did afterwards decide upon supplying this deficiency by a translation of the *Advancement of Learning* enlarged; that he produced the *De Augmentis Scientiarum* with that intention and understanding; and that though the original edition does not bear "*Instaurationis Magnæ pars prima*" on the titlepage, yet in Dr. Rawley's reprint of it in 1638 those words were inserted. Nevertheless this notice is of importance, as showing that when Bacon published the *Novum Organum* he did not look to a mere *enlargement* of the *Advancement of Learning* as satisfying the intention of the *pars prima*; for if he had, he would have referred to the work itself, not to the second book only. He meant, no doubt, to reproduce the substance of it in a different form. And my own impression is that the *Descriptio Globi Intellectualis* was originally designed for this place, and that he had not yet abandoned the hope of completing it; but that soon after,—fortune gone, health shaken, assistance not to be commanded, and things of more importance remaining to be done,—he found he had not time to finish it on so large a scale, and therefore resolved to enlarge the old house instead of building a new one.—*J. S.*

[2] This explains a certain discrepancy between the design of the second part, as set forth in the *Distributio Operis*, and the execution of it in the *Novum Organum*. The *Distributio*, like the *Delineatio*, was probably written when Bacon intended to work it out in a regular and consecutive treatise, and represents the *idea* of the work more perfectly than the work itself. See note on Distr. Op. p. 139.—*J. S.*

PARS SECUNDA OPERIS,

QUÆ DICITUR

NOVUM ORGANUM,

SIVE

INDICIA VERA

DE INTERPRETATIONE NATURÆ.

PRÆFATIO.

Qui de natura tanquam de re explorata pronuntiare ausi sunt, sive hoc ex animi fiducia fecerint sive ambitiose et more professorio, maximis illi philosophiam et scientias detrimentis affecere. Ut enim ad fidem faciendam validi, ita etiam ad inquisitionem extinguendam et abrumpendam efficaces fuerunt. Neque virtute propria tantum profuerunt, quantum in hoc nocuerunt, quod aliorum virtutem corruperint et perdiderint. Qui autem contrariam huic viam ingressi sunt atque nihil prorsus sciri posse asseruerunt, sive ex sophistarum veterum odio sive ex animi fluctuatione aut etiam ex quadam doctrinæ copia in hanc opinionem delapsi sint, certe non contemnendas ejus rationes adduxerunt; veruntamen nec a veris initiis sententiam suam derivarunt, et studio quodam atque affectatione provecti, prorsus modum excesserunt. At antiquiores ex Græcis (quorum scripta perierunt) inter pronuntiandi jactantiam et *Acatalepsiæ* desperationem prudentius se sustinuerunt: atque de inquisitionis difficultate et rerum obscuritate sæpius querimonias et indignationes miscentes, et veluti frænum mordentes, tamen propositum urgere atque naturæ se immiscere non destiterunt; consentaneum (ut videtur) existimantes, hoc ipsum (videlicet utrum aliquid sciri possit) non disputare, sed experiri. Et tamen illi ipsi, impetu tantum intellectus usi, regulam non adhibuerunt, sed omnia in acri meditatione et mentis volutatione et agitatione perpetua posuerunt.

Nostra autem ratio, ut opere ardua, ita dictu facilis est. Ea enim est, ut certitudinis gradus constituamus, sensum per reductionem quandam tueamur[1], sed mentis opus quod sensum subsequitur plerunque rejiciamus; novam autem et certam viam, ab ipsis sensuum perceptionibus, menti aperiamus et muniamus. Atque hoc proculdubio viderunt et illi qui tantas

[1] The word "reductio" appears to be used much as in modern scientific language; that is, as nearly equivalent to correction; — as when we speak of *reducing* observations, &c., by which is meant the applying to them of certain principles of correction: I should translate the clause in which it occurs by "we guard the sense from error by a certain method of correction;"—a translation which accords with what is said infra, I. 69., with respect to the short-comings and errors of the senses.

dialecticæ partes tribuerunt. Ex quo liquet, illos intellectui adminicula quæsivisse, mentis autem processum nativum et sponte moventem, suspectum habuisse. Sed serum plane rebus perditis hoc adhibetur remedium; postquam mens ex quotidiana vitæ consuetudine, et auditionibus et doctrinis inquinatis occupata, et vanissimis *idolis* obsessa fuerit. Itaque ars illa dialecticæ, sero (ut diximus) cavens neque rem ullo modo restituens, ad errores potius figendos quam ad veritatem aperiendam valuit. Restat unica salus ac sanitas, ut opus mentis universum de integro resumatur; ac mens, jam ab ipso principio, nullo modo sibi permittatur, sed perpetuo regatur; ac res veluti per machinas conficiatur. Sane si homines opera mechanica nudis manibus, absque instrumentorum vi et ope, aggressi essent, quemadmodum opera intellectualia nudis fere mentis viribus tractare non dubitarunt, parvæ admodum fuissent res quas movere et vincere potuissent, licet operas enixas atque etiam conjunctas præstitissent. Atque si paulisper morari, atque in hoc ipsum exemplum, veluti in speculum, intueri velimus; exquiramus (si placet) si forte obeliscus aliquis magnitudine insignis ad triumphi vel hujusmodi magnificentiæ decus transferendus esset, atque id homines nudis manibus aggrederentur, annon hoc magnæ cujusdam esse dementiæ spectator quispiam rei sobrius fateretur? Quod si numerum augerent operariorum, atque hoc modo se valere posse confiderent, annon tanto magis? Sin autem delectum quendam adhibere vellent, atque imbecilliores separare, et robustis tantum et vigentibus uti, atque hinc saltem se voti compotes fore sperarent, annon adhuc eos impensius delirare diceret? Quin etiam si hoc ipso non contenti, artem tandem athleticam consulere statuerent, ac omnes deinceps manibus et lacertis et nervis ex arte bene unctis et medicatis adesse juberent, annon prorsus eos dare operam ut cum ratione quadam et prudentia insanirent, clamaret? Atque homines tamen simili malesano impetu et conspiratione inutili feruntur in intellectualibus; dum ab ingeniorum vel multitudine et consensu vel excellentia et acumine magna sperant, aut etiam dialectica (quæ quædam athletica censeri possit) mentis nervos roborant; sed interim, licet tanto studio et conatu, (si quis vere judicaverit) intellectum nudum applicare non desinunt. Manifestissimum autem est, in omni opere magno, quod manus hominis præstat, sine instrumentis et machinis, vires nec singulorum intendi nec omnium coire posse.

Itaque ex his quæ diximus præmissis, statuimus duas esse res de quibus homines plane monitos volumus, ne forte illæ eos fugiant aut prætereant. Quarum prima hujusmodi est; fieri fato quodam (ut existimamus) bono, ad extinguendas et depellendas contradictiones et tumores animorum, ut et veteribus honor et reverentia intacta et imminuta maneant, et nos destinata perficere et tamen modestiæ nostræ fructum percipere possimus. Nam nos, si profiteamur nos meliora afferre quam antiqui, eandem quam illi viam ingressi, nulla verborum arte efficere possimus, quin inducatur quædam ingenii vel excellentiæ vel facultatis comparatio sive contentio; non ea quidem illicita aut nova; — quidni enim possimus pro jure nostro (neque eo ipso alio, quam omnium) si quid apud eos non recte inventum aut positum sit, reprehendere aut notare?—sed tamen utcunque justa aut permissa, nihilominus impar fortasse fuisset ea ipsa contentio, ob virium nostrarum modum. Verum quum per nos illud agatur, ut alia omnino via intellectui aperiatur illis intentata et incognita, commutata jam ratio est; cessant studium et partes; nosque indicis tantummodo personam sustinemus, quod mediocris certe est authoritatis, et fortunæ cujusdam potius quam facultatis et excellentiæ. Atque hæc moniti species ad personas pertinet; altera ad res ipsas.

Nos siquidem de deturbanda ea quæ nunc floret philosophia, aut si quæ alia sit aut erit hac emendatior aut auctior, minime laboramus. Neque enim officimus, quin philosophia ista recepta, et aliæ id genus, disputationes alant, sermones ornent, ad professoria munera et vitæ civilis compendia adhibeantur et valeant. Quin etiam aperte significamus et declaramus, eam quam nos adducimus philosophiam ad istas res admodum utilem non futuram. Non præsto est, neque in transitu capitur, neque ex prænotionibus intellectui blanditur, neque ad vulgi captum nisi per utilitatem et effecta descendet.

Sint itaque (quod fœlix faustumque sit utrique parti) duæ doctrinarum emanationes, ac duæ dispensationes; duæ similiter contemplantium sive philosophantium tribus ac veluti cognationes; atque illæ neutiquam inter se inimicæ aut alienæ, sed fœderatæ et mutuis auxiliis devinctæ: sit denique alia scientias colendi, alia inveniendi ratio. Atque quibus prima potior et acceptior est, ob festinationem, vel vitæ civilis rationes, vel quod illam alteram ob mentis infirmitatem capere et complecti non possint (id quod longe plurimis accidere necesse est), opta-

mus ut iis fœliciter et ex voto succedat quod agunt, atque ut quod sequuntur teneant. Quod si cui mortalium cordi et curæ sit, non tantum inventis hærere atque iis uti, sed ad ulteriora penetrare; atque non disputando adversarium, sed opere naturam vincere; denique, non belle et probabiliter opinari, sed certo et ostensive scire; tales, tanquam veri scientiarum filii, nobis (si videbitur) se adjungant; ut omissis naturæ atriis, quæ infiniti contriverunt, aditus aliquando ad interiora patefiat. Atque ut melius intelligamur, utque illud ipsum quod volumus ex nominibus impositis magis familiariter occurrat, altera ratio sive via *Anticipatio Mentis*, altera *Interpretatio Naturæ*, a nobis appellari consuevit.

Est etiam quod petendum videtur. Nos certe cogitationem suscepimus et curam adhibuimus, ut quæ a nobis proponentur non tantum vera essent, sed etiam ad animos hominum (licet miris modis occupatos et interclusos) non incommode aut aspere accederent. Veruntamen æquum est, ut ab hominibus impetremus (in tanta præsertim doctrinarum et scientiarum restauratione) ut qui de hisce nostris aliquid, sive ex sensu proprio, sive ex authoritatum turba, sive ex demonstrationum formis (quæ nunc tanquam leges quædam judiciales invaluerunt), statuere aut existimare velit, ne id in transitu et velut aliud agendo facere se posse speret; sed ut rem pernoscat; nostram, quam describimus et munimus, viam ipse paullatim tentet; subtilitati rerum quæ in experientia signata est assuescat; pravos denique atque alte hærentes mentis habitus tempestiva et quasi legitima mora corrigat; atque tum demum (si placuerit) postquam in potestate sua esse cœperit, judicio suo utatur.

SEQUITUR

PARTIS SECUNDÆ SUMMA,

DIGESTA

IN APHORISMOS.

PARTIS SECUNDÆ SUMMA,

DIGESTA IN

APHORISMOS.

APHORISMI

DE INTERPRETATIONE NATURÆ ET REGNO HOMINIS.

APHORISMUS

I.

HOMO, Naturæ minister[1] et interpres, tantum facit et intelligit quantum de Naturæ ordine re vel mente observaverit, nec amplius scit aut potest.

II.

Nec manus nuda nec intellectus sibi permissus multum valet; instrumentis et auxiliis res perficitur; quibus opus est non minus ad intellectum quam ad manum. Atque ut instrumenta manus motum aut cient aut regunt, ita et instrumenta mentis intellectui aut suggerunt aut cavent.

III.

Scientia et potentia humana in idem coincidunt, quia ignoratio causæ destituit effectum. Natura enim non nisi parendo vincitur[2]; et quod in contemplatione instar causæ est, id in operatione instar regulæ est.

IV.

Ad opera nil aliud potest homo, quam ut corpora naturalia admoveat et amoveat; reliqua Natura intus transigit.[3]

V.

Solent se immiscere naturæ (quoad opera) mechanicus, mathematicus, medicus, alchymista, et magus; sed omnes (ut nunc sunt res) conatu levi, successu tenui.

VI.

Insanum quiddam esset, et in se contrarium, existimare ea quæ adhuc nunquam facta sunt fieri posse, nisi per modos adhuc nunquam tentatos.

[1] That the physician is "naturæ minister," *φύσεως ὑπηρέτης*, is quoted more than once from Hippocrates by Galen, xv. 369. xvi. 35. (Kuhn): the first passage in his commentary on Hippoc. *De Aliment.* iii., the second in his do. *De Humor.* i.

[2] This antithesis was probably suggested by Publius Syrus's gnome: — "Casta ad virum matrona parendo imperat."

[3] For some remarks upon the first four Aphorisms, see the Preface, p. 88. — *J. S.*

VII.

Generationes mentis et manus numerosæ admodum videntur in libris et opificiis. Sed omnis ista varietas sita est in subtilitate eximia, et derivationibus pauearum rerum quæ innotuerunt; non in numero Axiomatum.

VIII.

Etiam opera, quæ jam inventa sunt, casui debentur et experientiæ magis quam scientiis: scientiæ enim, quas nunc habemus, nihil aliud sunt quam quædam concinnationes rerum antea inventarum; non modi inveniendi, aut designationes novorum operum.

IX.

Causa vero et radix fere omnium malorum in scientiis ea una est; quod dum mentis humanæ vires falso miramur et extollimus, vera ejus auxilia non quæramus.

X.

Subtilitas naturæ subtilitatem sensus et intellectus multis partibus superat; ut pulchræ illæ meditationes et speculationes humanæ et causationes res male-sana sint, nisi quod non adsit qui advertat.[1]

XI.

Sicut scientiæ quæ nunc habentur inutiles sunt ad inventionem operum; ita et logica quæ nunc habetur inutilis est ad inventionem scientiarum.

XII.

Logica quæ in usu est ad errores (qui in notionibus vulgaribus fundantur) stabiliendos et figendos valet, potius quam ad inquisitionem veritatis; ut magis damnosa sit quam utilis.

XIII.

Syllogismus ad principia scientiarum non adhibetur, ad media axiomata frustra adhibetur, cum sit subtilitati naturæ longe impar. Assensum itaque constringit, non res.

XIV.

Syllogismus ex propositionibus constat, propositiones ex verbis, verba notionum tesseræ sunt. Itaque si notiones ipsæ (id quod basis rei est) confusæ sint et temere a rebus abstractæ, nihil in iis quæ superstruuntur est firmitudinis. Itaque spes est una in *inductione* vera.

[1] That is, they must from the nature of the case be so far from the truth, that, if we could but compare them with the reality, they would seem like the work of men not in their senses. — *J. S.*

XV.

In notionibus nil sani est, nec in logicis nec in physicis; non *Substantia*, non *Qualitas*, *Agere*, *Pati*, ipsum *Esse*, bonæ notiones sunt; multo minus *Grave*, *Leve*, *Densum*, *Tenue*, *Humidum*, *Siccum*, *Generatio*, *Corruptio*, *Attrahere*, *Fugare*, *Elementum*, *Materia*, *Forma*, et id genus; sed omnes phantasticæ et male terminatæ.

XVI.

Notiones infimarum specierum, *Hominis*, *Canis*, *Columbæ*, et prehensionum immediatarum sensus, *Calidi*, *Frigidi*, *Albi*, *Nigri*, non fallunt magnopere; quæ tamen ipsæ a fluxu materiæ et commistione[1] rerum quandoque confunduntur; reliquæ omnes (quibus homines hactenus usi sunt) aberrationes sunt, nec debitis modis a rebus abstractæ et excitatæ.

XVII.

Nec minor est libido et aberratio in constituendis axiomatibus, quam in notionibus abstrahendis; idque in ipsis principiis, quæ ab inductione vulgari pendent. At multo major est in axiomatibus et propositionibus inferioribus, quæ educit syllogismus.

XVIII.

Quæ adhuc inventa sunt in scientiis, ea hujusmodi sunt ut notionibus vulgaribus fere subjaceant; ut vero ad interiora et remotiora naturæ penetretur, necesse est ut tam notiones quam axiomata magis certa et munita via a rebus abstrahantur; atque omnino melior et certior intellectus adoperatio in usum veniat.

XIX.

Duæ viæ sunt, atque esse possunt, ad inquirendam et inveniendam veritatem. Altera a sensu et particularibus advolat ad axiomata maxime generalia, atque ex iis principiis eorumque immota veritate judicat et invenit axiomata media; atque hæc via in usu est: altera a sensu et particularibus excitat axiomata, ascendendo continenter et gradatim, ut ultimo loco perveniatur ad maxime generalia; quæ via vera est, sed intentata.

[1] [*Commissione* in the original edition. — *J. S.*] From the context it is clear that Bacon means that the union of bodies of different kinds, by giving rise to new qualities and species intermediate to those for which we have recognised names, tends to confuse our ideas of the latter. I think therefore we ought to read "commistione" for "commissione." [The word *commistio* is used elsewhere by Bacon; see for instance II. 13. § 34. — *J. S.*]

XX.

Eandem ingreditur viam (priorem scilicet) intellectus sibi permissus, quam facit ex ordine dialecticæ. Gestit enim mens exilire ad magis generalia, ut acquiescat; et post parvam moram fastidit experientiam. Sed hæc mala demum aucta sunt a dialectica, ob pompas disputationum.

XXI.

Intellectus sibi permissus, in ingenio sobrio et patiente et gravi (præsertim si a doctrinis receptis non impediatur), tentat nonnihil illam alteram viam, quæ recta est, sed exiguo profectu; cum intellectus, nisi regatur et juvetur, res inæqualis sit, et omnino inhabilis ad superandam rerum obscuritatem.[1]

XXII.

Utraque via orditur a sensu et particularibus, et acquiescit in maxime generalibus; sed immensum quiddam discrepant; cum altera perstringat tantum experientiam et particularia cursim, altera in iis rite et ordine versetur; altera rursus jam a principio constituat generalia quædam abstracta et inutilia, altera gradatim exurgat ad ea quæ revera naturæ sunt notiora.[2]

XXIII.

Non leve quiddam interest inter humanæ mentis *idola* et divinæ mentis ideas; hoc est, inter placita quædam inania et veras signaturas[3] atque impressiones factas in creaturis, prout inveniuntur.

XXIV.

Nullo modo fieri potest, ut axiomata per argumentationem constituta ad inventionem novorum operum valeant; quia sub-

[1] I should be inclined to translate this clause, "since the intellect, if it be not guided and assisted, *acts irregularly* (res inæqualis sit), and is altogether unequal to overcoming the obscurity of nature." Thus in § 60. we meet with a similar use of the adverb "*inæqualiter*:" —"temere et inæqualiter a rebus abstracta"—"rashly and irregularly abstracted from their objects." Or perhaps, though this translation would not be free from objection, inæqualis might be rendered "inadequate" or unequal to the matter in hand.

[2] This phrase is a scholastic mistranslation of the Aristotelian phrase τῇ φύσει γνωριμώτερον· *i. e.* naturally better known, or naturally better fitted to be the object of knowledge. It is difficult to render the phrase accurately either into Latin or into English, because in neither language is there an adjective corresponding to the Greek γνώριμος; "notus" and "known" being of course participles, and immediately suggesting the question, "known to whom?" [See note on Distrib. Operis, p. 137. In his English writings, Bacon seems to use the word "original" as equivalent to "naturæ notius." Compare the instruction for "freeing a direction," in the *Valerius Terminus*, with the "præceptum verum et perfectum operandi," in the *Nov. Org.* ii. 4.; where the rule that "the nature discovered be *more original* than the nature supposed and not more secondary or of the like degree," in the one, corresponds with the precept "Forma vera talis sit ut naturam datam ex fonte aliquo essentiæ deducat, quæ inest pluribus et *notior est naturæ* (ut loquuntur) quam ipsa forma," in the other.—*J. S.*]

[3] See note on Distr. Op. p. 145.—*J. S.*

tilitas naturæ subtilitatem argumentandi multis partibus superat. Sed axiomata a particularibus rite et ordine abstracta nova particularia rursus facile indicant et designant; itaque scientias reddunt activas.

XXV.

Axiomata quæ in usu sunt ex tenui et manipulari experientia et paucis particularibus, quæ ut plurimum occurrunt, fluxere; et sunt fere ad mensuram eorum facta et extensa: ut nil mirum sit, si ad nova particularia non ducant. Quod si forte instantia aliqua non prius animadversa aut cognita se offerat, axioma distinctione aliqua frivola salvatur, ubi emendari ipsum verius foret.

XXVI.

Rationem humanam qua utimur ad naturam, *Anticipationes Naturæ* (quia res temeraria est et præmatura), at illam rationem quæ debitis modis elicitur a rebus, *Interpretationem Naturæ*, docendi gratia vocare consuevimus.

XXVII.

Anticipationes satis firmæ sunt ad consensum; quandoquidem si homines etiam insanirent ad unum modum et conformiter, illi satis bene inter se congruere possent.

XXVIII.

Quin longe validiores sunt ad subeundum assensum Anticipationes quam Interpretationes; quia ex paucis collectæ, iisque maxime quæ familiariter occurrunt, intellectum statim perstringunt et phantasiam implent: ubi contra Interpretationes, ex rebus admodum variis et multum distantibus sparsim collectæ, intellectum subito percutere non possunt; ut necesse sit eas, quoad opiniones, duras et absonas, fere instar mysteriorum fidei, videri.

XXIX.

In scientiis quæ in opinionibus et placitis fundatæ sunt, bonus est usus Anticipationum et Dialecticæ; quando opus est assensum subjugare, non res.

XXX.

Non, si omnia omnium ætatum ingenia coierint et labores contulerint et transmiserint, progressus magnus fieri poterit in scientiis per Anticipationes; quia errores radicales, et in prima digestione mentis, ab excellentia functionum et remediorum sequentium non curantur.

XXXI.

Frustra magnum expectatur augmentum in scientiis ex superinductione et insitione novorum super vetera; sed instauratio facienda est ab imis fundamentis, nisi libeat perpetuo circumvolvi in orbem, cum exili et quasi contemnendo progressu.

XXXII.

Antiquis authoribus suus constat honos, atque adeo omnibus; quia non ingeniorum aut facultatum inducitur comparatio, sed viæ; nosque non judicis sed indicis personam sustinemus.

XXXIII.

Nullum (dicendum enim est aperte) recte fieri potest judicium nec de via nostra, nec de iis quæ secundum eam inventa sunt, per Anticipationes (rationem scilicet quæ in usu est); quia non postulandum est ut ejus rei judicio stetur, quæ ipsa in judicium vocatur.

XXXIV.

Neque etiam tradendi aut explicandi ea quæ adducimus facilis est ratio; quia quæ in se nova sunt intelligentur tamen ex analogia veterum.[1]

XXXV.

Dixit Borgia de expeditione Gallorum in Italiam, eos venisse cum creta in manibus ut diversoria notarent, non cum armis ut perrumperent[2]: itidem et nostra ratio est, ut doctrina nostra animos idoneos et capaces subintret; confutationum enim nullus est usus, ubi de principiis et ipsis notionibus, atque etiam de formis demonstrationum, dissentimus.

XXXVI.

Restat vero nobis modus tradendi unus et simplex, ut homines ad ipsa particularia et eorum series et ordines adducamus; et ut illi rursus imperent sibi ad tempus abnegationem Notionum, et cum rebus ipsis consuescere incipiant.

XXXVII.

Ratio eorum qui *acatalepsiam* tenuerunt, et via nostra, initiis

[1] For the meaning of "analogia" see note on the Distr. Op. p. 138.—*J. S.*

[2] "Diceva in quei tempi Papa Alessandro sesto che i Francesi havevano corso l'Italia con gli speroni di legno et presola col gesso: dicendo così perchè pigliando essi gli alloggiamenti nelle città loro furieri segnavano le porte delle case col gesso; et cavalcando per loro diporto i gentil' huomini per le terre à sollazzo usavano di portare nelle scarpette à calcagni certi stecchi di legno appuntati, delli quali in vece di speroni si servivano per andare le cavalcature."—*Nardi, Vita di Malespini,* [1597,] p. 18.

In an epitome of the history of Charles the Eighth, which will be found in the "Archives curieuses" of Cember, vol. i. p. 197., and which was apparently written about the beginning of the seventeenth century, the remark ascribed to Alexander the Sixth by Nardi and Bacon is mentioned as a popular saying.

suis quodammodo consentiunt; exitu immensum disjunguntur et opponuntur. Illi enim nihil sciri posse simpliciter asserunt; nos non multum sciri posse in natura, ea quæ nunc in usu est via: verum illi exinde authoritatem sensus et intellectus destruunt; nos auxilia iisdem excogitamus et subministramus.

XXXVIII.

Idola et notiones falsæ quæ intellectum humanum jam occuparunt atque in eo alte hærent, non solum mentes hominum ita obsident ut veritati aditus difficilis pateat; sed etiam dato et concesso aditu, illa rursus in ipsa instauratione scientiarum occurrent et molesta erunt, nisi homines præmoniti adversus ea se quantum fieri potest muniant.

XXXIX.

Quatuor sunt genera Idolorum quæ mentes humanas obsident. Iis (docendi gratia) nomina imposuimus; ut primum genus, Idola Tribus; secundum, Idola Specus; tertium, Idola Fori; quartum, Idola Theatri vocentur.[1]

XL.

Excitatio Notionum et Axiomatum per Inductionem veram, est certe proprium remedium ad Idola arcenda et summovenda; sed tamen indicatio Idolorum magni est usus. Doctrina enim de Idolis similiter se habet ad Interpretationem Naturæ, sicut doctrina de Sophisticis Elenchis ad Dialecticam vulgarem.

XLI.

Idola Tribus sunt fundata in ipsa natura humana, atque in ipsa tribu seu gente hominum. Falso enim asseritur, sensum humanum esse mensuram rerum[2]; quin contra, omnes perceptiones tam sensus quam mentis sunt ex analogia hominis, non

[1] These four idols have been compared to the four hindrances to truth enumerated by Roger Bacon. These are, the use of insufficient authority, custom, popular opinions, and the concealment of ignorance and display of apparent knowledge. The last two may be likened to the idols of the market-place and the theatre. But the principle of the classification is different. [See on this subject the Preface, p. 90. Roger Bacon's words are as follows:—

"Quatuor vero maxima sunt comprehendendæ veritatis offendicula, quæ omnem quemcunque sapientem impediunt, et vix aliquem permittunt ad verum titulum sapientiæ pervenire: viz. fragilis et indignæ auctoritatis exemplum, consuetudinis diuturnitas, vulgi sensus imperiti, et propriæ ignorantiæ occultatio cum ostentatione sapientiæ apparentis. His omnis homo involvitur, omnis status occupatur. Nam quilibet singulis artibus vitæ et studii et omnis negotii tribus pessimis ad eandem conclusionem utitur argumentis: scil. hoc exemplificatum est per majores, hoc consuetum est, hoc vulgatum est, ergo tenendum. . . . . Si vero hæc tria refellantur aliquando magnificâ rationis potentiâ, quartum semper in promptu est et in ore cujuslibet, ut quilibet ignorantiam suam excuset, et licet nihil dignum sciat illud tamen magnificet imprudenter [impudenter?] et sic saltem suæ stultitiæ infelici solatio veritatem opprimat et elidat."— *Opus Majus*, l. i. — *J. S.*]

[2] Protagoras. See Hippias Major.

ex analogia universi. Estque intellectus humanus instar speculi inæqualis ad radios rerum, qui suam naturam naturæ rerum immiscet, eamque distorquet et inficit.

XLII.

Idola Specus sunt idola hominis individui. Habet enim unusquisque (præter aberrationes naturæ humanæ in genere) specum sive cavernam quandam individuam, quæ lumen naturæ frangit et corrumpit; vel propter naturam cūjusque propriam et singularem; vel propter educationem et conversationem cum aliis; vel propter lectionem librorum, et authoritates eorum quos quisque colit et miratur; vel propter differentias impressionum, prout occurrunt in animo præoccupato et prædisposito aut in animo æquo et sedato, vel ejusmodi; ut plane spiritus humanus (prout disponitur in hominibus singulis) sit res varia, et omnino perturbata, et quasi fortuita: unde bene Heraclitus, homines scientias quærere in minoribus mundis, et non in majore sive communi.[1]

XLIII.

Sunt etiam Idola tanquam ex contractu et societate humani generis ad invicem, quæ Idola Fori, propter hominum commercium et consortium, appellamus. Homines enim per sermones sociantur; at verba ex captu vulgi imponuntur. Itaque mala et inepta verborum impositio miris modis intellectum obsidet. Neque definitiones aut explicationes, quibus homines docti se munire et vindicare in nonnullis consueverunt, rem ullo modo restituunt. Sed verba plane vim faciunt intellectui, et omnia turbant; et homines ad inanes et innumeras controversias et commenta deducunt.

XLIV.

Sunt denique Idola quæ immigrarunt in animos hominum ex diversis dogmatibus philosophiarum, ac etiam ex perversis legibus demonstrationum; quæ Idola Theatri nominamus; quia quot philosophiæ receptæ aut inventæ sunt, tot fabulas productas et actas censemus, quæ mundos effecerunt fictitios et scenicos. Neque de his quæ jam habentur, aut etiam de veteribus philosophiis et sectis, tantum loquimur; cum complures aliæ ejusmodi fabulæ componi et concinnari possint; quandoquidem errorum prorsus diversorum causæ sint nihilominus fere communes.

[1] See Sextus Empiricus, *Adversus Logicos*, i. § 133.; and compare ii. § 186. of the same treatise.

Neque rursus de philosophiis universalibus tantum hoc intelligimus, sed etiam de principiis et axiomatibus compluribus scientiarum, quæ ex traditione et fide et neglectu invaluerunt. Verum de singulis istis generibus idolorum fusius et distinctius dicendum est, ut intellectui humano cautum sit.

XLV.[1]

Intellectus humanus ex proprietate sua[2] facile supponit majorem ordinem et æqualitatem in rebus quam invenit; et cum multa sint in natura monodica[3] et plena imparitatis, tamen affingit parallela et correspondentia et relativa quæ non sunt. Hinc commenta illa, *in cœlestibus omnia moveri per circulos perfectos*, lineis spiralibus et draconibus[4] (nisi nomine tenus) prorsus rejectis. Hinc elementum ignis cum orbe suo introductum est, ad constituendam quaternionem cum reliquis tribus, quæ subjiciuntur sensui.[5] Etiam elementis (quæ vocant) imponitur ad placitum decupla proportio excessus in raritate ad invicem[6]: et hujusmodi somnia. Neque vanitas ista tantum valet in dogmatibus, verum etiam in notionibus simplicibus.

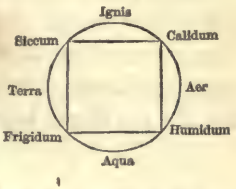
[1] Here, according to the tripartite distribution of the "Pars Destruens" mentioned in the 115th aphorism, begins the first Redargutio — Redargutio Rationis Humanæ Nativæ. — *J. S.*

[2] That is "in accordance with the homogeneity of its own substance," or as Bacon expresses it in § 52., "ex æqualitate substantiæ spiritus humani."

[3] The word which Bacon intends to use is, of course, "monadica;" but throughout his writings he has fallen into the error of which the text affords an instance.

[4] It does not appear in what sense Bacon uses the word "draco." In its ordinary acceptation in old astronomy, it denoted the great circle which is approximately the projection on the sphere of the moon's orbit. The ascending node was called the caput draconis, and the descending the cauda draconis. The same terms were occasionally applied to the nodes of the planetary orbits. It is not improbable that Bacon intended to complain of the rejection of spirals of double curvature, or helices, which traced on the surface of the sphere might represent inequalities in latitude. Compare (Nov. Org. II. 48.) what is said of the variations of which the "motus rotationis spontaneus" admits.

[5] The orb of the element of fire was supposed to lie above that of the element of air, and therefore might be said "non subjici sensui." The quaternion of elements follows directly from the quaternion of elementary qualities; namely, hot, cold, moist, dry. For these may be combined two and two in six different ways; two of these combinations are rejected as simply contradictory (viz. hot and cold, moist and dry); and to each of the other combinations corresponds one of the four elements. The diagram will illustrate.



[6] This doctrine of the decupla ratio of density of the elements was suggested by a passage in Aristotle [De Gen. et Cor. ii. 6.]. It is found in all books of mediæval physics. Cf. the *Margarita Philosophiæ*, ix. c. 4., or Alsted's *Encyclopædia*, where it is thus expressed: "Proportio elementorum ad se invicem ratione transmutationis est decupla, ratione magnitudinis non satis explorata." The transmutability of one element into another is an essential part of the Peripatetic doctrine of elements. It is found also in the *Timæus*.

XLVI.

Intellectus humanus, in iis quæ semel placuerunt (aut quia recepta sunt et credita, aut quia delectant), alia etiam omnia trahit ad suffragationem et consensum cum illis; et licet major sit instantiarum vis et copia quæ occurrunt in contrarium, tamen eas aut non observat aut contemnit aut distinguendo summovet et rejicit, non sine magno et pernicioso præjudicio, quo prioribus illis syllepsibus authoritas maneat inviolata. Itaque recte respondit ille, qui, cum suspensa tabula in templo ei monstraretur eorum qui vota solverant quod naufragii periculo elapsi sint, atque interrogando premeretur anne tum quidem deorum numen agnosceret, quæsivit denuo, At *ubi sint illi depicti qui post vota nuncupata perierint?* [1] Eadem ratio est fere omnis superstitionis, ut in astrologicis, in somniis, ominibus, nemesibus, et hujusmodi; in quibus homines delectati hujusmodi vanitatibus advertunt eventus ubi implentur, ast ubi fallunt (licet multo frequentius) tamen negligunt et prætereunt. At longe subtilius serpit hoc malum in philosophiis et scientiis; in quibus quod semel placuit reliqua (licet multo firmiora et potiora) inficit et in ordinem redigit. Quinetiam licet abfuerit ea quam diximus delectatio et vanitas, is tamen humano intellectui error est proprius et perpetuus, ut magis moveatur et excitetur affirmativis quam negativis; cum rite et ordine æquum se utrique præbere debeat; quin contra, in omni axiomate vero constituendo, major est vis instantiæ negativæ.

XLVII.

Intellectus humanus illis quæ simul et subito mentem ferire et subire possunt maxime movetur; a quibus phantasia impleri et inflari consuevit; reliqua vero modo quodam, licet imperceptibili, ita se habere fingit et supponit, quomodo se habent pauca illa quibus mens obsidetur; ad illum vero transcursum ad instantias remotas et heterogeneas, per quas axiomata tanquam igne probantur, tardus omnino intellectus est et inhabilis, nisi hoc illi per duras leges et violentum imperium imponatur.

XLVIII.

Gliscit intellectus humanus, neque consistere aut acquiescere potis est, sed ulterius petit; at frustra. Itaque incogitabile

[1] This story is told of Diagoras by Cicero, De Nat. Deor. III., and of Diogenes the Cynic by Diogenes Laertius.

est ut sit aliquid extremum aut extimum mundi, sed semper quasi necessario occurrit ut sit aliquid ulterius[1]: neque rursus cogitari potest quomodo æternitas defluxerit ad hunc diem; cum distinctio illa quæ recipi consuevit, quod sit *infinitum a parte ante et a parte post*, nullo modo constare possit; quia inde sequeretur, quod sit unum infinitum alio infinito majus, atque ut consumatur infinitum, et vergat ad finitum. Similis est subtilitas de lineis semper divisibilibus[2], ex impotentia cogitationis. At majore cum pernicie intervenit hæc impotentia mentis in inventione causarum: nam cum maxime universalia in natura positiva esse debeant, quemadmodum inveniuntur, neque sunt revera causabilia; tamen intellectus humanus, nescius acquiescere, adhuc appetit notiora. Tum vero ad ulteriora tendens ad proximiora recidit, videlicet ad causas finales, quæ sunt plane ex natura hominis potius quam universi[3]; atque ex hoc fonte philosophiam miris modis corruperunt. Est autem æque imperiti et leviter philosophantis, in maxime universalibus causam requirere, ac in subordinatis et subalternis causam non desiderare.[4]

XLIX.

Intellectus humanus luminis sicci non est[5]; sed recipit infu-

[1] Thus Leibnitz derived from the principle of sufficient reason a proof of the infinite extent of the universe, alleging that if it were of finite dimensions no reason could be given for its occupying any one region of space rather than any other.

[2] In the phrase "subtilitas de lineis semper divisibilibus," reference is made to Aristotle, who in several places in his writings (particularly in the tract *περὶ ἀτόμων γραμμάτων*) maintains that in theory every magnitude is divisible sine limite.

[3] This censure appears to be expressed without sufficient limitation; for it is difficult to assent to the assertion that the notion of the final cause, considered generally, is more ex naturâ hominis than that of the efficient. The subject is one of which it is difficult to speak accurately; but it may be said that wherever we think that we recognise a tendency towards a fulfilment or realisation of an idea, there the notion of the final cause comes in. It can only be from inadvertence that Professor Owen has set the doctrine of the final cause as it were in antithesis to that of the unity of type: by the former he means the doctrine that the suitability of an animal to its mode of life is the one thing aimed at or intended in its structure. It cannot be doubted that Aristotle would have recognised the preservation of the type as not less truly a final cause than the preservation of the species or than the well-being of the individual. The final cause connects itself with what in the language of modern German philosophy is expressed by the phrase "the Idea in Nature."

[4] *ἔστι γὰρ ἀπαιδευσία τὸ μὴ γιγνώσκειν τίνων δεῖ ζητεῖν ἀπόδειξιν καὶ τίνων οὐ δεῖ, ὅλως μὲν γὰρ ἀπάντων ἀδύνατον ἀπόδειξιν εἶναι· εἰς ἄπειρον γὰρ ἂν βαδίζοι· ὥστε μήδ' οὕτως εἶναι ἀπόδειξιν.* — Metaph., iii. 4.

[5] Heraclitus apud Plut., De Esu Carnium. This doctrine of Idols is spoken of with great disrespect by Spinoza. He asserts that neither Des Cartes nor Bacon ever perceived the true source of error, and adds: "De Bacone parum dicam, qui de hâc re admodum confuse loquitur, et fere nihil probat, sed tantum narrat:" and concludes by saying, "quas adhuc alias causas adsignat (he has just enumerated

sionem a voluntate et affectibus, id quod generat *Ad quod vult scientias.* Quod enim mavult homo verum esse, id potius credit. Rejicit itaque difficilia, ob inquirendi impatientiam; sobria, quia coarctant spem; altiora naturæ, propter superstitionem; lumen experientiæ, propter arrogantiam et fastum, ne videatur mens versari in vilibus et fluxis; paradoxa, propter opinionem vulgi; denique innumeris modis, iisque interdum imperceptibilibus, affectus intellectum imbuit et inficit.

L.

At longe maximum impedimentum et aberratio intellectus humani provenit a stupore et incompetentia et fallaciis sensuum; ut ea quæ sensum feriant, illis quæ sensum immediate non feriunt, licet potioribus, præponderent. Itaque contemplatio fere desinit cum aspectu; adeo ut rerum invisibilium exigua aut nulla sit observatio. Itaque omnis operatio spirituum in corporibus tangibilibus inclusorum latet, et homines fugit. Omnis etiam subtilior meta-schematismus in partibus rerum crassiorum (quem vulgo alterationem vocant, cum sit revera latio per minima) latet similiter: et tamen nisi duo ista quæ diximus explorata fuerint et in lucem producta, nihil magni fieri potest in natura quoad opera. Rursus ipsa natura aëris communis et corporum omnium quæ aërem tenuitate superant (quæ plurima sunt) fere incognita est. Sensus enim per se res infirma est et aberrans; neque organa ad amplificandos sensus aut acuendos multum valent; sed omnis verior interpretatio naturæ conficitur per instantias, et experimenta idonea et apposita; ubi sensus de experimento tantum, experimentum de natura et re ipsa judicat.

LI.

Intellectus humanus fertur ad abstracta propter naturam propriam, atque ea quæ fluxa sunt fingit esse constantia. Melius autem est naturam secare, quam abstrahere[1]; id quod Democriti schola fecit, quæ magis penetravit in naturam quam reliquæ. Materia potius considerari debet, et ejus schematismi et meta-schematismi, atque actus purus, et lex actus sive

three of the Idols of the Tribe) facile omnes ad unicam Cartesii reduci possunt; scilicet quia voluntas humana est libera et latior intellectu; sive, ut ipse Verulamius magis confuse loquitur, quia intellectus luminis sicci non est, sed recipit infusionem a voluntate." See *Spinoza to Oldenburg*, ep. 2. vol. ii. p. 146. of Bruder's edition.

[1] "Naturam secare," to dissect nature into her constituent parts; "Naturam abstrahere," to resolve nature into abstractions.

motus; Formæ enim commenta animi humani sunt, nisi libeat leges illas actus Formas appellare.

LII.

Hujusmodi itaque sunt Idola, quæ vocamus Idola Tribus; quæ ortum habent aut ex æqualitate substantiæ spiritus humani[1]; aut ex præoccupatione ejus; aut ab angustiis ejus; aut ab inquieto motu ejus; aut ab infusione affectuum; aut ab incompetentia sensuum; aut ab impressionis modo.

LIII.

Idola Specus ortum habent ex propria cujusque natura et animi et corporis; atque etiam ex educatione, et consuetudine, et fortuitis. Quod genus licet sit varium et multiplex, tamen ea proponemus in quibus maxima cautio est, quæque plurimum valent ad polluendum intellectum ne sit purus.

LIV.

Adamant homines scientias et contemplationes particulares; aut quia authores et inventores se earum credunt; aut quia plurimum in illis operæ posuerunt, iisque maxime assueverunt. Hujusmodi vero homines, si ad philosophiam et contemplationes universales se contulerint, illas ex prioribus phantasiis detorquent et corrumpunt; id quod maxime conspicuum cernitur in Aristotele, qui naturalem suam philosophiam logicæ suæ prorsus mancipavit, ut eam fere inutilem et contentiosam reddiderit. Chymicorum autem genus, ex paucis experimentis fornacis, philosophiam constituerunt phantasticam et ad pauca spectantem. Quinetiam Gilbertus, postquam in contemplationibus magnetis se laboriosissime exercuisset, confinxit statim philosophiam consentaneam rei apud ipsum præpollenti.

LV.

Maximum et velut radicale discrimen ingeniorum, quoad philosophiam et scientias, illud est; quod alia ingenia sint fortiora et aptiora ad notandas rerum differentias, alia ad notandas rerum similitudines. Ingenia enim constantia et acuta figere contemplationes et morari et hærere in omni subtilitate differentiarum possunt: ingenia autem sublimia et discursiva etiam tenuissimas et catholicas rerum similitudines et agnoscunt et componunt. Utrumque autem ingenium facile labitur in excessum, prensando aut gradus rerum aut umbras.

[1] Compare *Advanc. of Learning*: "That the spirit of man *being of an equal and uniform substance* doth usually suppose and feign in nature a greater equality and uniformity than is in truth." — *J. S.*

LVI.

Reperiuntur ingenia alia in admirationem antiquitatis, alia in amorem et amplexum novitatis effusa; pauca vero ejus temperamenti sunt ut modum tenere possint, quin aut quæ recte posita sunt ab antiquis convellant, aut ea contemnant quæ recte afferuntur a novis. Hoc vero magno scientiarum et philosophiæ detrimento fit; quum studia potius sint antiquitatis et novitatis, quam judicia; veritas autem non a felicitate temporis alicujus, quæ res varia est, sed a lumine naturæ et experientiæ, quod æternum est, petenda est. Itaque abneganda sunt ista studia, et videndum ne intellectus ab illis ad consensum abripiatur.

LVII.

Contemplationes naturæ et corporum in simplicitate sua, intellectum frangunt et comminuunt[1]: contemplationes vero naturæ et corporum in compositione et configuratione sua, intellectum stupefaciunt et solvunt.[2] Id optime cernitur in schola Leucippi et Democriti[3], collata cum reliquis philosophiis. Illa enim ita versatur in particulis rerum, ut fabricas fere negligat: reliquæ autem ita fabricas intuentur attonitæ, ut ad simplicitatem naturæ non penetrent. Itaque alternandæ sunt contemplationes istæ et vicissim sumendæ; ut intellectus reddatur simul penetrans et capax, et evitentur ea quæ diximus incommoda atque Idola ex iis provenientia.

LVIII.

Talis itaque esto prudentia contemplativa in arcendis et summovendis Idolis Specus; quæ aut ex prædominantia, aut ex excessu compositionis et divisionis, aut ex studiis erga tempora, aut ex objectis largis et minutis, maxime ortum habent. Generaliter autem pro suspecto habendum unicuique rerum naturam contemplanti, quicquid intellectum suum potissimum capit et detinet; tantoque major adhibenda in hujusmodi placitis est cautio, ut intellectus servetur æquus et purus.

LIX.

At Idola Fori omnium molestissima sunt; quæ ex fœdere verborum et nominum se insinuarunt in intellectum. Credunt enim homines rationem suam verbis imperare; sed fit etiam ut verba vim suam super intellectum retorqueant et reflectant;

[1] *i. e.* Break up the understanding and distract it in minute observation of the parts.—*J. S.*

[2] *i. e.* Astonish and dissolve it in a vain endeavour to take in the whole.—*J. S.*

[3] That is, in the Atomists.

quod philosophiam et scientias reddidit sophisticas et inactivas. Verba autem plerunque ex captu vulgi induntur, atque per lineas vulgari intellectui maxime conspicuas res secant. Quum autem intellectus acutior aut observatio diligentior eas lineas transferre velit, ut illæ sint magis secundum naturam, verba obstrepunt. Unde fit ut magnæ et solennes disputationes hominum doctorum sæpe in controversias circa verba et nomina desinant; a quibus (ex more et prudentia mathematicorum) incipere consultius foret, easque per definitiones in ordinem redigere. Quæ tamen definitiones, in naturalibus et materiatis, huic malo mederi non possunt; quoniam et ipsæ definitiones ex verbis constant, et verba gignunt verba: adeo ut necesse sit ad instantias particulares earumque series et ordines recurrere; ut mox dicemus, quum ad modum et rationem constituendi notiones et axiomata deventum fuerit.

LX.

Idola quæ per verba intellectui imponuntur duorum generum sunt. Aut enim sunt rerum nomina quæ non sunt (quemadmodum enim sunt res quæ nomine carent per inobservationem, ita sunt et nomina quæ carent rebus per suppositionem phantasticam); aut sunt nomina rerum quæ sunt, sed confusa et male terminata, et temere et inæqualiter a rebus abstracta. Prioris generis sunt Fortuna, Primum Mobile, Planetarum Orbes, Elementum Ignis, et hujusmodi commenta, quæ a vanis et falsis theoriis ortum habent. Atque hoc genus Idolorum facilius ejicitur, quia per constantem abnegationem et antiquationem theoriarum exterminari possunt.

At alterum genus perplexum est et alte hærens; quod ex mala et imperita abstractione excitatur. Exempli gratia, accipiatur aliquod verbum (*Humidum*, si placet), et videamus quomodo sibi constent quæ per hoc verbum significantur; et invenietur verbum istud *Humidum* nihil aliud quam nota confusa diversarum actionum, quæ nullam constantiam aut reductionem patiuntur. Significat enim et quod circa aliud corpus facile se circumfundit; et quod in se est indeterminabile, nec consistere potest; et quod facile cedit undique; et quod facile se dividit et dispergit; et quod facile se unit et colligit; et quod facile fluit et in motu ponitur; et quod alteri corpori facile adhæret, idque madefacit; et quod facile reducitur in liquidum, sive colliquatur, cum antea consisteret. Itaque cum ad hujus nominis prædicationem et impositionem ventum sit, si

alia accipias, flamma humida est; si alia accipias, aër humidus non est; si alia, pulvis minutus humidus est; si alia, vitrum humidum est; ut facile appareat istam notionem ex aqua tantum et communibus et vulgaribus liquoribus, absque ulla debita verificatione, temere abstractam esse.

In verbis autem gradus sunt quidam pravitatis et erroris. Minus vitiosum genus est nominum substantiæ alicujus, præsertim specierum infimarum et bene deductarum (nam notio Cretæ, Luti, bona; Terræ mala); vitiosius genus est actionum, ut Generare, Corrumpere, Alterare: vitiosissimum qualitatum (exceptis objectis sensus immediatis), ut Gravis, Levis, Tenuis, Densi, etc.; et tamen in omnibus istis fieri non potest, quin sint aliæ notiones aliis paulo meliores, prout in sensum humanum incidit rerum copia.[1]

LXI.

At Idola Theatri innata non sunt, nec occulto insinuata in intellectum; sed ex fabulis theoriarum et perversis legibus demonstrationum plane indita et recepta. In his autem confutationes tentare et suscipere consentaneum prorsus non est illis quæ a nobis dicta sunt. Quum enim nec de principiis consentiamus nec de demonstrationibus, tollitur omnis argumentatio. Id vero bono fit fato, ut antiquis suus constet honos. Nihil enim illis detrahitur, quum de via omnino quæstio sit. Claudus enim (ut dicitur) in via antevertit cursorem extra viam. Etiam illud manifesto liquet, currenti extra viam, quo habilior sit et velocior, eo majorem contingere aberrationem.

Nostra vero inveniendi scientias ea est ratio, ut non multum ingeniorum acumini et robori relinquatur; sed quæ ingenia et intellectus fere exæquet. Quemadmodum enim ad hoc, ut linea recta fiat aut circulus perfectus describatur, multum est in constantia et exercitatione manus, si fiat ex vi manus propria; sin autem adhibeatur regula aut circinus, parum aut nihil; omnino similis est nostra ratio. Licet autem confutationum particularium nullus sit usus, de sectis tamen et generibus hujusmodi theoriarum nonnihil dicendum est; atque etiam paulo post de signis exterioribus, quod se male habeant; et postremo de causis

[1] Here, according to the tripartite distribution of the subject mentioned in aphorism 115, the first of the three Redargutiones ends. The following aphorisms from 61 to 115 contain the two others, Redargutio Philosophiarum and Redargutio Demonstrationum, which are not kept quite separate. The 69th and 70th aphorisms belong especially to the last.—*J. S.*

tantæ infelicitatis et tam diuturni et generalis in errore consensus; ut ad vera minus difficilis sit aditus, et intellectus humanus volentius expurgetur et Idola dimittat.

LXII.

Idola Theatri, sive theoriarum, multa sunt, et multo plura esse possunt, et aliquando fortasse erunt. Nisi enim per multa jam sæcula hominum ingenia circa religionem et theologiam occupata fuissent, atque etiam politiæ civiles (præsertim monarchiæ) ab istiusmodi novitatibus, etiam in contemplationibus, essent aversæ; ut cum periculo et detrimento fortunarum suarum in illas homines incumbant, non solum præmio destituti, sed etiam contemptui et invidiæ expositi; complures aliæ proculdubio philosophiarum et theoriarum sectæ, similes illis quæ magna varietate olim apud Græcos floruerunt, introductæ fuissent. Quemadmodum enim super phænomena ætheris plura themata cœli confingi possunt; similiter, et multo magis, super phænomena philosophiæ fundari possunt et constitui varia dogmata. Atque hujusmodi theatri fabulæ habent etiam illud quod in theatro poetarum usu venit, ut narrationes fictæ ad scenam narrationibus ex historia veris concinniores sint et elegantiores, et quales quis magis vellet.

In genere autem, in materiam philosophiæ sumitur aut multum ex paucis aut parum ex multis; ut utrinque philosophia super experientiæ et naturalis historiæ nimis angustam basin fundata sit, atque ex paucioribus quam par est pronunciet. Rationale enim genus philosophantium ex experientia arripiunt varia et vulgaria, eaque neque certo comperta nec diligenter examinata et pensitata; reliqua in meditatione atque ingenii agitatione ponunt.

Est et aliud genus philosophantium, qui in paucis experimentis sedulo et accurate elaborarunt, atque inde philosophias educere et confingere ausi sunt; reliqua miris modis ad ea detorquentes.

Est et tertium genus eorum, qui theologiam et traditiones ex fide et veneratione immiscent; inter quos vanitas nonnullorum ad petendas et derivandas scientias a Spiritibus scilicet et Geniis deflexit; ita ut stirps errorum, et philosophia falsa, genere triplex sit: Sophistica, Empirica, et Superstitiosa.

LXIII.

Primi generis exemplum in Aristotele maxime conspicuum est, qui philosophiam naturalem dialectica sua corrupit; quum

mundum ex categoriis effecerit; animæ humanæ, nobilissimæ substantiæ, genus ex vocibus secundæ intentionis tribuerit[1]; negotium Densi et Rari, per quod corpora subeunt majores et minores dimensiones sive spatia, per frigidam distinctionem Actus et Potentiæ[2] transegerit; motum singulis corporibus unicum et proprium[3], et si participent ex alio motu id aliunde moveri, asseruerit; et innumera alia, pro arbitrio suo, naturæ rerum imposuerit: magis ubique sollicitus quomodo quis respondendo se explicet, et aliquid reddatur in verbis positivum, quam de interna rerum veritate; quod etiam optime se ostendit in comparatione philosophiæ ejus ad alias philosophias quæ apud Græcos celebrabantur. Habent enim Homoiomera Anaxagoræ, Atomi Leucippi et Democriti, Cœlum et Terra Parmenidis, Lis et Amicitia Empedoclis, Resolutio corporum in adiaphoram naturam ignis et Replicatio eorundem ad densum Heracliti, aliquid ex philosopho naturali, et rerum naturam et experientiam et corpora sapiunt; ubi Aristotelis Physica nihil aliud quam dialecticæ voces plerunque sonet; quam etiam in Metaphysicis sub solenniore nomine, et ut magis scilicet realis, non nominalis, retractavit. Neque illud quenquam moveat, quod in libris ejus de animalibus, et in problematibus, et in aliis suis tractatibus, versatio frequens sit in experimentis. Ille enim prius decreverat, neque experientiam ad constituenda decreta et axiomata rite consuluit; sed postquam pro arbitrio suo decrevisset, experientiam ad sua placita tortam circumducit et captivam; ut hoc etiam nomine magis accusandus sit, quam sectatores ejus moderni (scholasticorum philosophorum genus) qui experientiam omnino deseruerunt.

LXIV.

At philosophiæ genus Empiricum placita magis deformia et monstrosa educit, quam Sophisticum aut rationale genus; quia non in luce notionum vulgarium (quæ licet tenuis sit et superficialis, tamen est quodammodo universalis et ad multa pertinens)

[1] This censure refers to Aristotle's definition of the soul, *De Anima*, ii. 1.,—ἡ πρώτη ἐντελέχεια σώματος φυσικοῦ ὀργανικοῦ,—in which the word Entelecheia is, as the scholastic commentators remark, assigned as the genus to which the soul is referred.

[2] The "frigida distinctio actus et potentiæ" refers apparently to the *Phys. Ausc.* iv. c. 5.; where it is said that water is air in potentiâ, and vice versâ. The possibility of their reciprocal transmutation Bacon does not appear to have doubted of. [With reference to this censure of Aristotle, see the preface to the *Historia Densi et Rari* — *J. S.*]

[3] "Simplicis corporis simplicem esse motum" is an important principle in Aristotelian physics, as one of the bases on which the system of the universe was made to depend. See, for instance, Melanchthon's *Initia Doctr. Physicæ*, p. 41.

sed in paucorum experimentorum angustiis et obscuritate fundatum est. Itaque talis philosophia illis qui in hujusmodi experimentis quotidie versantur atque ex ipsis phantasiam contaminarunt probabilis videtur, et quasi certa; cæteris, incredibilis et vana. Cujus exemplum notabile est in chymicis, eorumque dogmatibus; alibi autem vix hoc tempore invenitur, nisi forte in philosophia Gilberti. Sed tamen circa hujusmodi philosophias cautio nullo modo prætermittenda erat; quia mente jam prævidemus et auguramur, si quando homines, nostris monitis excitati, ad experientiam se serio contulerint (valere jussis doctrinis sophisticis), tum demum propter præmaturam et præproperam intellectus festinationem, et saltum sive volatum ad generalia et rerum principia, fore ut magnum ab hujusmodi philosophiis periculum immineat; cui malo etiam nunc obviam ire debemus.

LXV.

At corruptio philosophiæ ex Superstitione et theologia admista, latius omnino patet, et plurimum mali infert, aut in philosophias integras aut in earum partes. Humanus enim intellectus non minus impressionibus phantasiæ est obnoxius, quam impressionibus vulgarium notionum. Pugnax enim genus philosophiæ et Sophisticum illaqueat intellectum: at illud alterum phantasticum et tumidum, et quasi Poeticum, magis blanditur intellectui. Inest enim homini quædam intellectus ambitio, non minor quam voluntatis; præsertim in ingeniis altis et elevatis.

Hujus autem generis exemplum inter Græcos illucescit, præcipue in Pythagora, sed cum superstitione magis crassa et onerosa conjunctum; at periculosius et subtilius in Platone, atque ejus schola. Invenitur etiam hoc genus mali in partibus philosophiarum reliquarum, introducendo formas abstractas, et causas finales, et causas primas; omittendo sæpissime medias, et hujusmodi. Huic autem rei summa adhibenda est cautio. Pessima enim res est errorum Apotheosis, et pro peste intellectus habenda est, si vanis accedat veneratio. Huic autem vanitati nonnulli ex modernis summa levitate ita indulserunt, ut in primo capitulo Geneseos et in libro Job et aliis scripturis sacris, philosophiam naturalem fundare conati sint; *inter viva quærentes mortua.* Tantoque magis hæc vanitas inhibenda venit et coercenda, quia ex divinorum et humanorum malesana admistione non solum educitur philosophia phantastica, sed

etiam religio hæretica. Itaque salutare admodum est, si mente sobria fidei tantum dentur quæ fidei sunt.[1]

LXVI.

Et de malis authoritatibus philosophiarum, quæ aut in vulgaribus notionibus, aut in paucis experimentis, aut in superstitione fundatæ sunt, jam dictum est. Dicendum porro est et de vitiosa materia contemplationum, præsertim in philosophia naturali. Inficitur autem intellectus humanus ex intuitu eorum quæ in artibus mechanicis fiunt, in quibus corpora per compositiones aut separationes ut plurimum alterantur; ut cogitet simile quiddam etiam in natura rerum universali fieri. Unde fluxit commentum illud Elementorum, atque illorum concursu, ad constituenda corpora naturalia. Rursus, quum homo naturæ libertatem[2] contempletur, incidit in species rerum, animalium, plantarum, mineralium; unde facile in eam labitur cogitationem, ut existimet esse in natura quasdam formas rerum primarias, quas natura educere molitur, atque reliquam varietatem ex impedimentis et aberrationibus naturæ in opere suo conficiendo, aut ex diversarum specierum conflictu et transplantatione alterius in alteram, provenire. Atque prima cogitatio qualitates primas elementares, secunda proprietates occultas et virtutes specificas, nobis peperit[3]; quarum utraque pertinet ad inania contemplationum compendia, in quibus acquiescit animus et a solidioribus avertitur. At medici, in secundis rerum qualitatibus et operationibus, attrahendi, repellendi, attenuandi, inspissandi, dilatandi, astringendi, discutiendi, maturandi, et hujusmodi, operam præstant meliorem; atque nisi ex illis duobus (quæ dixi) compendiis (qualitatibus scilicet elementaribus, et virtutibus specificis) illa altera (quæ recte notata sunt) corrumperent, reducendo illa ad primas qualitates earumque mixturas subtiles et incommensurabiles, aut ea non producendo cum majore et diligentiore observatione ad qualitates tertias et quartas, sed contemplationem intempestive abrumpendo, illi multo melius profecissent. Neque hujusmodi virtutes (non dico eædem, sed

[1] Compare Kepler's phrase: "Missum faciat Spiritum Sanctum, neque illum in scholas physicas cum ludibrio pertrahat."— *De Stellâ Martis Præfat.*

[2] That is, nature acting freely, in opposition to nature constrained by the conditions of our experiments.

[3] The elementary qualities are four in number,—hot, cold, dry, moist; and it is by combining them two and two that the Peripatetic conception of the nature of each element is formed. Thus fire is hot and dry, water cold and moist, &c. All the other qualities of bodies, which result from the combination and mutual modification of the elementary and primary qualities, were called secondary qualities.

similes) in humani corporis medicinis tantum exquirendæ sunt; sed etiam in cæterorum corporum naturalium mutationibus.

Sed multo adhuc majore cum malo fit, quod quiescentia rerum principia, *ex quibus*, et non moventia, *per quæ*, res fiunt, contemplentur et inquirant. Illa enim ad sermones, ista ad opera spectant. Neque enim vulgares illæ differentiæ Motus, quæ in naturali philosophia recepta notantur, Generationis, Corruptionis, Augmentationis, Diminutionis, Alterationis, et Lationis, ullius sunt pretii.[1] Quippe hoc sibi volunt; si corpus, alias non mutatum, loco tamen moveatur, hoc Lationem esse; si manente et loco et specie, qualitate mutetur, hoc Alterationem esse; si vero ex illa mutatione moles ipsa et quantitas corporis non eadem maneat, hoc Augmentationis et Diminutionis motum esse; si eatenus mutentur ut speciem ipsam et substantiam mutent et in alia migrent, hoc Generationem et Corruptionem esse. At ista mere popularia sunt, et nullo modo in naturam penetrant; suntque mensuræ et periodi tantum, non species motus. Innuunt enim illud *hucusque*, et non *quomodo* vel *ex quo fonte*. Neque enim de corporum appetitu, aut de partium eorum processu, aliquid significant; sed tantum quum motus ille rem aliter ac prius, crasso modo, sensui exhibeat, inde divisionem suam auspicantur. Etiam quum de causis motuum aliquid significare volunt, atque divisionem ex illis instituere, differentiam motus naturalis et violenti, maxima cum socordia, introducunt; quæ et ipsa omnino ex notione vulgari est; cum omnis motus violentus etiam naturalis revera sit, scilicet cum externum efficiens naturam alio modo in opere ponet quam quo prius.

At hisce omissis; si quis (exempli gratia) observaverit, inesse corporibus appetitum contactus ad invicem, ut non patiantur unitatem naturæ prorsus dirimi aut abscindi, ut vacuum detur; aut si quis dicat, inesse corporibus appetitum se recipiendi in naturalem suam dimensionem vel tensuram, ut si ultra eam aut citra eam comprimantur aut distrahantur, statim in veterem sphæram et exporrectionem suam se recuperare et remittere moliantur; aut si quis dicat, inesse corporibus appetitum congregationis ad massas connaturalium suorum, densorum videlicet versus orbem terræ, tenuiorum et rariorum versus ambitum cœli; hæc et hujusmodi vere physica sunt

[1] In the *Physics*, Aristotle does not reckon Generation and Corruption as kinds of motion. Bacon's enumeration is that given in the *Categories*.

genera motuum; at illa altera plane logica sunt et scholastica, ut ex hac collatione eorum manifesto liquet.

Neque minus etiam malum est, quod in philosophiis et contemplationibus suis, in principiis rerum atque ultimitatibus naturæ investigandis et tractandis opera insumatur; cum omnis utilitas et facultas operandi in mediis consistat. Hinc fit, ut abstrahere naturam homines non desinant, donec ad materiam potentialem et informem ventum fuerit; nec rursus secare naturam desinant, donec perventum fuerit ad atomum; quæ, etiamsi vera essent, tamen ad juvandas hominum fortunas parum possunt.[1]

LXVII.

Danda est etiam cautio intellectui de intemperantiis philosophiarum, quoad assensum præbendum aut cohibendum; quia hujusmodi intemperantiæ videntur Idola figere, et quodammodo perpetuare, ne detur aditus ad ea summovenda.

Duplex autem est excessus: alter eorum qui facile pronunciant, et scientias reddunt positivas et magistrales; alter eorum qui Acatalepsiam introduxerunt, et inquisitionem vagam sine termino; quorum primus intellectum deprimit, alter enervat. Nam Aristotelis philosophia, postquam ceteras philosophias (more Ottomanorum erga fratres suos) pugnacibus confutationibus contrucidasset, de singulis pronunciavit; et ipse rursus quæstiones ex arbitrio suo subornat, deinde conficit; ut omnia certa sint et decreta; quod etiam apud successiones suas valet, et in usu est.

At Platonis schola Acatalepsiam introduxit, primo tanquam per jocum et ironiam, in odium veterum sophistarum, Protagoræ, Hippiæ, et reliquorum, qui nihil tam verebantur quam ne dubitare de re aliqua viderentur.[2] At Nova Academia Acatalepsiam dogmatizavit, et ex professo tenuit. Quæ licet honestior ratio sit quam pronunciandi licentia, quum ipsi pro se dicant se minime confundere inquisitionem, ut Pyrrho fecit et Ephectici, sed habere quod sequantur ut probabile, licet non habeant quod teneant ut verum; tamen postquam animus huma-

[1] The construction of this sentence is somewhat abrupt. The relative *quæ* must be referred to some such antecedent as "doctrines of this character;" and for *possunt* we ought to read *possent*. For the antithesis between abstrahere and secare, see § 51. The first part of Bacon's censure refers to Aristotle.

[2] "Tum Velleius, fidenter sane, ut solent isti, nihil tam verens quam ne dubitare aliqua de re videretur; tanquam modo ex Deorum concilio et ex Epicuri intermundiis descendisset; Audite, inquit," &c. — *Cic. De Nat. Deor.* i. c. 8.

nus de veritate invenienda semel desperaverit, omnino omnia fiunt languidiora: ex quo fit, ut deflectant homines potius ad amœnas disputationes et discursus, et rerum quasdam peragrationes, quam in severitate inquisitionis se sustineant. Verum quod a principio diximus, et perpetuo agimus, sensui et intellectui humano eorumque infirmitati authoritas non est deroganda, sed auxilia præbenda.

LXVIII.

Atque de Idolorum singulis generibus, eorumque apparatu jam diximus; quæ omnia constanti et solenni decreto sunt abneganda et renuncianda, et intellectus ab iis omnino liberandus est et expurgandus; ut non alius fere sit aditus ad regnum hominis, quod fundatur in scientiis, quam ad regnum cœlorum, *in quod, nisi sub persona infantis, intrare non datur.*

LXIX.

At pravæ demonstrationes, Idolorum veluti munitiones quædam sunt et præsidia; eæque quas in dialecticis habemus id fere agunt, ut mundum plane cogitationibus humanis, cogitationes autem verbis, addicant et mancipent. Demonstrationes vero potentia quadam philosophiæ ipsæ sunt et scientiæ. Quales enim eæ sunt, ac prout rite aut male institutæ, tales sequuntur philosophiæ et contemplationes. Fallunt autem et incompetentes sunt eæ quibus utimur in universo illo processu qui a sensu et rebus ducit ad axiomata et conclusiones. Qui quidem processus quadruplex est, et vitia ejus totidem. Primo, impressiones sensus ipsius vitiosæ sunt; sensus enim et destituit et fallit. At destitutionibus substitutiones, fallaciis rectificationes debentur. Secundo, notiones ab impressionibus sensuum male abstrahuntur, et interminatæ et confusæ sunt, quas terminatas et bene finitas esse oportuit. Tertio, inductio mala est, quæ per enumerationem simplicem principia concludit scientiarum, non adhibitis exclusionibus et solutionibus, sive separationibus naturæ debitis. Postremo, modus ille inveniendi et probandi, ut primo principia maxime generalia constituantur, deinde media axiomata ad ea applicentur et probentur, errorum mater est et scientiarum omnium calamitas. Verum de istis, quæ jam obiter perstringimus, fusius dicemus, cum veram interpretandæ naturæ viam, absolutis istis expiationibus et expurgationibus mentis, proponemus.

LXX.

Sed demonstratio longe optima est experientia; modo hæreat

in ipso experimento. Nam si traducatur ad alia quæ similia existimantur, nisi rite et ordine fiat illa traductio, res fallax est. At modus experiendi quo homines nunc utuntur cæcus est et stupidus. Itaque cum errant et vagantur nulla via certa, sed ex occursu rerum tantum consilium capiunt, circumferuntur ad multa sed parum promovent; et quandoque gestiunt quandoque distrahuntur; et semper inveniunt quod ulterius quærant. Fere autem ita fit, ut homines leviter et tanquam per ludum experiantur, variando paululum experimenta jam cognita; et si res non succedat, fastidiendo et conatum deserendo. Quod si magis serio et constanter ac laboriose ad experimenta se accingant, tamen in uno aliquo experimento eruendo operam collocant; quemadmodum Gilbertus in magnete, chymici in auro. Hoc autem faciunt homines instituto non minus imperito quam tenui. Nemo enim alicujus rei naturam in ipsa re fœliciter perscrutatur, sed amplianda est inquisitio ad magis communia.

Quod si etiam scientiam quandam et dogmata ex experimentis moliantur, tamen semper fere studio præpropero et intempestivo deflectunt ad praxin; non tantum propter usum et fructum ejusmodi praxeos, sed ut in opere aliquo novo veluti pignus sibi arripiant, se non inutiliter in reliquis versaturos; atque etiam aliis se venditent, ad existimationem meliorem comparandam de iis in quibus occupati sunt. Ita fit ut, more Atalantæ, de via decedant ad tollendum aureum pomum; interim vero cursum interrumpant, et victoriam emittant e manibus. Verum in experientiæ vero curriculo, eoque ad nova opera producendo, Divina Sapientia omnino et ordo pro exemplari sumenda sunt. Deus autem primo die creationis lucem tantum creavit, eique operi diem integrum attribuit; nec aliquid materiati operis eo die creavit. Similiter et ex omnimoda experientia, primum inventio causarum et axiomatum verorum elicienda est; et lucifera experimenta, non fructifera quærenda. Axiomata autem recte inventa et constituta praxin non strictim sed confertim instruunt, et operum agmina ac turmas post se trahunt. Verum de experiendi viis, quæ non minus quam viæ judicandi obsessæ sunt et interclusæ, postea dicemus; impræsentiarum de experientia vulgari, tanquam de mala demonstratione, tantum loquuti. Jam vero postulat ordo rerum, ut de iis quorum paulo ante mentionem fecimus signis, quod philosophiæ et cōntemplationes in usu male se habeant, et de causis rei primo intuitu tam mirabilis et incredibilis, quædam subjungamus. Signorum

enim notio præparat assensum: causarum vero explicatio tollit miraculum. Quæ duo ad extirpationem Idolorum ex intellectu faciliorem et clementiorem multum juvant.

LXXI.

Scientiæ quas habemus fere a Græcis fluxerunt. Quæ enim scriptores Romani aut Arabes aut recentiores addiderunt, non multa aut magni momenti sunt; et qualiacunque sint, fundata sunt super basin eorum quæ inventa sunt a Græcis.[1] Erat autem sapientia Græcorum professoria, et in disputationes effusa: quod genus inquisitioni veritatis adversissimum est. Itaque nomen illud Sophistarum, quod per contemptum ab iis qui se philosophos haberi voluerunt in antiquos rhetores rejectum et traductum est, Gorgiam, Protagoram, Hippiam, Polum, etiam universo generi competit Platoni, Aristoteli, Zenoni, Epicuro, Theophrasto, et eorum successoribus, Chrysippo, Carneadi, reliquis. Hoc tantum intererat; quod prius genus vagum fuerit et mercenarium, civitates circumcursando, et sapientiam suam ostentando, et mercedem exigendo; alterum vero solennius et generosius, quippe eorum qui sedes fixas habuerunt, et scholas aperuerunt, et gratis philosophati sunt. Sed tamen utrumque genus (licet cætera dispar) professorium erat, et ad disputationes rem deducebat, et sectas quasdam atque hæreses philosophiæ instituebat et propugnabat: ut essent fere doctrinæ eorum (quod non male cavillatus est Dionysius in Platonem) *Verba otiosorum senum ad imperitos juvenes.*[2] At antiquiores illi ex Græcis, Empedocles, Anaxagoras, Leucippus, Democritus, Parmenides, Heraclitus, Xenophanes, Philolaus, reliqui, (nam Pythagoram, ut superstitiosum, omittimus,) scholas (quod novimus) non aperuerunt; sed majore silentio, et severius, et simplicius, id est, minore cum affectatione et ostentatione, ad inquisitionem veritatis se contulerunt. Itaque et melius, ut arbitramur, se gesserunt; nisi quod opera eorum a levioribus istis, qui vulgari captui et affectui magis respondent ac placent, tractu temporis extincta sint: tempore (ut fluvio) leviora et magis inflata ad nos devehente, graviora et solida mergente. Neque tamen isti a nationis vitio prorsus immunes erant: sed in ambitionem et vanitatem sectæ condendæ et auræ

[1] M. Chasles appears to have shown this with respect to the principle of position in arithmetic. We derive it, according to him, not from the Hindoos or Arabs, but from the Greeks. It is remarkable that the Chinese have from the earliest times known how to express any number by means of a few characters.

[2] *οἱ λόγοι σου γεροντιῶσι.* — Diog. Laert. in Platon. c. 18.

popularis captandæ nimium propendebant. Pro desperata autem habenda est veritatis inquisitio, cum ad hujusmodi inania leflectat. Etiam non omittendum videtur judicium illud, sive vaticinium potius, sacerdotis Ægyptii de Græcis: *quod semper pueri essent, neque haberent antiquitatem scientiæ, aut scientiam antiquitatis.*[1] Et certe habent id quod puerorum est; ut ad garriendum prompti sint, generare autem non possint: nam verbosa videtur sapientia eorum, et operum sterilis. Itaque ex ortu et gente philosophiæ quæ in usu est, quæ capiuntur signa bona non sunt.

LXXII.

Neque multo meliora sunt signa quæ ex natura temporis et ætatis capi possunt, quam quæ ex natura loci et nationis. Angusta enim erat et tenuis notitia per illam ætatem, vel temporis vel orbis: quod longe pessimum est, præsertim iis qui omnia in experientia ponunt. Neque enim mille annorum historiam, quæ digna erat nomine historiæ, habebant; sed fabulas et rumores antiquitatis. Regionum vero tractuumque mundi exiguam partem noverant; cum omnes hyperboreos, Scythas, omnes occidentales, Celtas, indistincte appellarent: nil in Africa ultra citimam Æthiopiæ partem, nil in Asia ultra Gangem, multo minus Novi Orbis provincias, ne per auditum sane aut famam aliquam certam et constantem, nossent; imo et plurima climata et zonæ, in quibus populi infiniti spirant et degunt, tanquam inhabitabiles ab illis pronuntiata sint: quinetiam peregrinationes Democriti, Platonis, Pythagoræ, non longinquæ profecto sed potius suburbanæ, ut magnum aliquid celebrarentur. Nostris autem temporibus et Novi Orbis partes complures et veteris orbis extrema undique innotescunt; et in infinitum experimentorum cumulus excrevit. Quare si ex nativitatis aut genituræ tempore (astrologorum more) signa capienda sint, nil magni de istis philosophiis significari videtur.

LXXIII.

Inter signa nullum magis certum aut nobile est, quam quod ex fructibus. Fructus enim, et opera inventa, pro veritate philosophiarum velut sponsores et fidejussores sunt. Atque ex philosophiis istis Græcorum, et derivationibus earum per particulares scientias, jam per tot annorum spatia vix unum experimentum adduci potest, quod ad hominum statum levandum et juvandum spectet, et philosophiæ speculationibus ac dogmatibus

[1] Timæus, p. 22. b. Ἕλληνες ἀεὶ παῖδές ἐστε, γέρων δὲ Ἕλλην οὐκ ἔστι.

vere acceptum referri possit. Idque Celsus ingenue ac prudenter fatetur; nimirum experimenta medicinæ primo inventa fuisse, ac postea homines circa ea philosophatos esse et causas indagasse et assignasse; non ordine inverso evenisse, ut ex philosophia et causarum cognitione ipsa experimenta inventa aut deprompta essent.[1] Itaque mirum non erat, apud Ægyptios (qui rerum inventoribus divinitatem et consecrationem attribuerunt) plures fuisse brutorum animalium imagines quam hominum: quia bruta animalia, per instinctus naturales, multa inventa pepererunt; ubi homines ex sermonibus et conclusionibus rationalibus pauca aut nulla exhibuerint.

At chymicorum industria nonnulla peperit; sed tanquam fortuito et obiter, aut per experimentorum quandam variationem (ut mechanici solent), non ex arte aut theoria aliqua; nam ea quam confinxerunt, experimenta magis perturbat quam juvat. Eorum etiam qui in magia (quam vocant) naturali versati sunt, pauca reperiuntur inventa; eaque levia et imposturæ propiora. Quocirca quemadmodum in religione cavetur, ut fides ex operibus monstretur; idem etiam ad philosophiam optime traducitur, ut ex fructibus judicetur et vana habeatur quæ sterilis sit; atque eo magis si, loco fructuum uvæ et olivæ, producat disputationum et contentionum carduos et spinas.

LXXIV.

Capienda etiam sunt signa ex incrementis et progressibus philosophiarum et scientiarum. Quæ enim in natura fundata sunt crescunt et augentur: quæ autem in opinione, variantur non augentur. Itaque si istæ doctrinæ plane instar plantæ a stirpibus suis revulsæ non essent, sed utero naturæ adhærerent atque ab eadem alerentur, id minime eventurum fuisset, quod per annos bis mille jam fieri videmus, nempe ut scientiæ suis hæreant vestigiis et in eodem fere statu maneant, neque augmentum aliquod memorabile sumpserint; quin potius in primo authore maxime floruerint, et deinceps declinaverint. In artibus autem mechanicis, quæ in natura et experientiæ luce fundatæ sunt, contra evenire videmus: quæ (quamdiu placent) veluti

[1] "Repertis deinde medicinæ remediis homines de rationibus eorum disserere cœpisse: nec post rationem medicinam esse inventam, sed post inventam medicinam rationem esse quæsitam." — *Celsus, Præfatio.*

But this remark is not made by Celsus as the expression of his own opinion; on the contrary it occurs in his statement of the views entertained by the empirical school of medicine, to which he is decidedly opposed. The error of citing Celsus as an authority for it is repeated in several parts of Bacon's works. [See among others *De Augmentis*, v. 2. — *J. S.*]

spiritu quodam repletæ continuo vegetant et crescunt; primo rudes, deinde commodæ, postea excultæ, et perpetuo auctæ.

LXXV.

Etiam aliud signum capiendum est (si modo signi appellatio huic competat; cum potius testimonium sit atque adeo testimoniorum omnium validissimum); hoc est propria confessio authorum, quos homines nunc sequuntur. Nam et illi qui tanta fiducia de rebus pronuntiant, tamen per intervalla cum ad se redeant, ad querimonias de naturæ subtilitate, rerum obscuritate, humani ingenii infirmitate, se convertunt. Hoc vero si simpliciter fieret, alios fortasse qui sunt timidiores ab ulteriori inquisitione deterrere, alios vero qui sunt ingenio alacriori et magis fidenti ad ulteriorem progressum acuere et incitare possit. Verum non satis illis est de se confiteri, sed quicquid sibi ipsis aut magistris suis incognitum aut intactum fuerit id extra terminos Possibilis ponunt, et, tanquam ex arte, cognitu aut factu impossibile pronuntiant: summa superbia et invidia, suorum inventorum infirmitatem in naturæ ipsius calumniam et aliorum omnium desperationem vertentes. Hinc schola Academiæ Novæ, quæ Acatalepsiam ex professo tenuit, et homines ad sempiternas tenebras damnavit. Hinc opinio, quod Formæ sive veræ rerum differentiæ (quæ revera sunt leges actus puri)[1] inventu impossibiles sint, et ultra hominem.[2] Hinc opiniones illæ in activa et operativa parte; calorem solis et ignis toto genere differre; ne scilicet homines putent, se per opera ignis aliquid simile iis quæ in natura fiunt educere et formare posse. Hinc illud: compositionem tantum opus hominis, mistionem vero opus solius naturæ esse[3]: ne scilicet homines sperent aliquam ex arte corporum naturalium generationem aut transformationem. Itaque ex hoc signo homines sibi persuaderi facile patientur, ne cum dogmatibus non solum desperatis sed etiam desperationi devotis fortunas suas et labores misceant.

LXXVI.

Neque illud signum prætermittendum est; quod tanta fuerit

[1] Compare II. § 2. "Licet enim in naturâ nihil vere existat præter corpora individua *edentia actus puros ex lege*, &c. Eam autem legem ejusque paragraphos *Formarum* nomine intelligimus." And for an explanation of the meaning of "actus *purus*" see the General Preface, p. 31.—*J. S.*

[2] The doctrine of the incognoscibility of forms is quoted by Boyle and Sennert. See the "Quid sint qualitates occultæ" of the latter, from Scaliger's *Exercitationes in Cardanum*, — a work which seems to have been very generally read.

[3] The reference is to Galen, who in his treatise *De Natural. Facultatibus* contrasts the inwardly formative power of nature with the external operations of art. See note on *Temporis Partus Masculus*.—*J. S.*

inter philosophos olim dissensio et scholarum ipsarum varietas: quod satis ostendit viam a sensu ad intellectum non bene munitam fuisse, cum eadem materia philosophiæ (natura scilicet rerum) in tam vagos et multiplices errores abrepta fuerit et distracta. Atque licet hisce temporibus dissensiones et dogmatum diversitates circa principia ipsa et philosophias integras ut plurimum extinctæ sint; tamen circa partes philosophiæ innumeræ manent quæstiones et controversiæ; ut plane appareat, neque in philosophiis ipsis neque in modis demonstrationum aliquid certi aut sani esse.

LXXVII.

Quod vero putant homines in philosophia Aristotelis magnum utique consensum esse; cum post illam editam antiquorum philosophiæ cessaverint et exoleverint, ast apud tempora quæ sequuta sunt nil melius inventum fuerit; adeo ut illa tam bene posita et fundata videatur, ut utrumque tempus ad se traxerit: primo, quod de cessatione antiquarum philosophiarum post Aristotelis opera edita homines cogitant, id falsum est; diu enim postea, usque ad tempora Ciceronis et sæcula sequentia, manserunt opera veterum philosophorum. Sed temporibus insequentibus, ex inundatione barbarorum in imperium Romanum postquam doctrina humana velut naufragium perpessa esset, tum demum philosophiæ Aristotelis et Platonis, tanquam tabulæ ex materia leviore et minus solida, per fluctus temporum servatæ sunt. Illud etiam de consensu fallit homines, si acutius rem introspiciant. Verus enim consensus is est, qui ex libertate judicii (re prius explorata) in idem conveniente consistit. At numerus longe maximus eorum qui in Aristotelis philosophiam consenserunt, ex præjudicio et authoritate aliorum se illi mancipavit; ut sequacitas sit potius et coitio, quam consensus. Quod si fuisset ille verus consensus et late patens, tantum abest ut consensus pro vera et solida authoritate haberi debeat, ut etiam violentam præsumptionem inducat in contrarium. Pessimum enim omnium est augurium quod ex consensu capitur in rebus intellectualibus; exceptis divinis et politicis, in quibus suffragiorum jus est.[1] Nihil enim multis placet, nisi imaginationem feriat, aut intellectum vulgarium notionum nodis astringat, ut supra dictum est. Itaque optime traducitur illud Phocionis a

[1] Bacon does not mean that the votes of a majority are necessarily valid in matters of divinity or politics, but merely that, from the nature of the case, the argument ex consensu has more weight in these than in purely scientific questions.

moribus ad intellectualia; *ut statim se examinare debeant homines, quid erraverint aut peccaverint, si multitudo consentiat et complaudat.*[1] Hoc signum igitur ex aversissimis est. Itaque quod signa veritatis et sanitatis philosophiarum et scientiarum quæ in usu sunt, male se habeant; sive capiantur ex originibus ipsarum, sive ex fructibus, sive ex progressibus, sive ex confessionibus authorum, sive ex consensu; jam dictum est.

LXXVIII.

Jam vero veniendum ad causas errorum, et tam diuturnæ in illis per tot sæcula moræ; quæ plurimæ sunt et potentissimæ: ut tollatur omnis admiratio, hæc quæ adducimus homines hucusque latuisse et fugisse; et maneat tantum admiratio, illa nunc tandem alicui mortalium in mentem venire potuisse, aut cogitationem cujuspiam subiisse: quod etiam (ut nos existimamus) felicitatis magis est cujusdam, quam excellentis alicujus facultatis; ut potius pro temporis partu haberi debeat, quam pro partu ingenii.

Primo autem tot sæculorum numerus, vere rem reputanti, ad magnas angustias recidit. Nam ex viginti quinque annorum centuriis, in quibus memoria et doctrina hominum fere versatur, vix sex centuriæ seponi et excerpi possunt, quæ scientiarum feraces earumve proventui utiles fuerunt. Sunt enim non minus temporum quam regionum eremi et vastitates. Tres enim tantum doctrinarum revolutiones et periodi recte numerari possunt: una, apud Græcos; altera, apud Romanos; ultima, apud nos, occidentales scilicet Europæ nationes: quibus singulis vix duæ centuriæ annorum merito attribui possunt. Media mundi tempora, quoad scientiarum segetem uberem aut lætam, infœlicia fuerunt. Neque enim causa est, ut vel Arabum vel Scholasticorum mentio fiat: qui per intermedia tempora scientias potius contriverunt numerosis tractatibus, quam pondus earum auxerunt. Itaque prima causa tam pusilli in scientiis profectus ad angustias temporis erga illas propitii rite et ordine refertur.

LXXIX.

At secundo loco se offert causa illa magni certe per omnia momenti: ea videlicet, quod per illas ipsas ætates quibus hominum ingenia et literæ maxime vel etiam mediocriter floruerint, Naturalis Philosophia minimam partem humanæ operæ sortita sit. Atque hæc ipsa nihilominus pro magna scientiarum matre haberi debet. Omnes enim artes et scientiæ ab

[1] Plutarch in Phocion, c. 8.

hac stirpe revulsæ, poliuntur fortasse et in usum effinguntur, sed nil admodum crescunt. At manifestum est, postquam Christiana fides recepta fuisset et adolevisset, longe maximam ingeniorum præstantissimorum partem ad Theologiam se contulisse; atque huic rei et amplissima præmia proposita, et omnis generis adjumenta copiosissime subministrata fuisse: atque hoc Theologiæ studium præcipue occupasse tertiam illam partem sive periodum temporis apud nos Europæos occidentales; eo magis, quod sub idem fere tempus et literæ florere et controversiæ circa religionem pullulare cœperint. At ævo superiori, durante periodo illa secunda apud Romanos, potissimæ philosophorum meditationes et industriæ in Morali Philosophia (quæ Ethnicis vice Theologiæ erat) occupatæ et consumptæ fuerunt: etiam summa ingenia illis temporibus ut plurimum ad res civiles se applicuerunt, propter magnitudinem imperii Romani, quod plurimorum hominum opera indigebat. At illa ætas, qua Naturalis Philosophia apud Græcos maxime florere visa est, particula fuit temporis minime diuturna; cum et antiquioribus temporibus septem illi qui sapientes nominabantur, omnes (præter Thaletem) ad Moralem Philosophiam et civilia se applicuerint; et posterioribus temporibus postquam Socrates philosophiam de cœlo in terras deduxisset, adhuc magis invaluerit Moralis Philosophia, et ingenia hominum a Naturali averterit.

At ipsissima illa periodus temporis in qua inquisitiones de natura viguerunt, contradictionibus et novorum placitorum ambitione corrupta est, et inutilis reddita. Itaque quandoquidem per tres istas periodos Naturalis Philosophia majorem in modum neglecta aut impedita fuerit, nil mirum si homines parum in ea re profecerint, cum omnino aliud egerint.

LXXX.

Accedit et illud, quod Naturalis Philosophia, in iis ipsis viris qui ei incubuerint, vacantem et integrum hominem, præsertim his recentioribus temporibus, vix nacta sit; nisi forte quis monachi alicujus in cellula, aut nobilis in villula lucubrantis, exemplum adduxerit: sed facta est demum Naturalis Philosophia instar transitus cujusdam et ponti-sternii ad alia.

Atque magna ista scientiarum mater mira indignitate ad officia ancillæ detrusa est; quæ medicinæ aut mathematicis operibus ministret, et rursus quæ adolescentium immatura ingenia lavet et imbuat velut tinctura quadam prima, ut aliam postea fœlicius et commodius excipiant. Interim nemo expectet

magnum progressum in scientiis (præsertim in parte earum operativa), nisi Philosophia Naturalis ad scientias particulares producta fuerit, et scientiæ particulares rursus ad Naturalem Philosophiam reductæ. Hinc enim fit, ut astronomia, optica, musica, plurimæ artes mechanicæ, atque ipsa medicina, atque (quod quis magis miretur) philosophia moralis et civilis, et scientiæ logicæ, nil fere habeant altitudinis in profundo; sed per superficiem et varietatem rerum tantum labantur: quia postquam particulares istæ scientiæ dispertitæ et constitutæ fuerint, a Philosophia Naturali non amplius alantur; quæ ex fontibus et veris contemplationibus motuum, radiorum, sonorum, texturæ et schematismi corporum, affectuum, et prehensionum intellectualium, novas vires et augmenta illis impertiri potuerit. Itaque minime mirum est si scientiæ non crescant, cum a radicibus suis sint separatæ.

LXXXI.

Rursus se ostendit alia causa potens et magna, cur scientiæ parum promoverint. Ea vero hæc est; quod fieri non possit, ut recte procedatur in curriculo, ubi ipsa meta non recte posita sit et defixa. Meta autem scientiarum vera et legitima non alia est, quam ut dotetur vita humana novis inventis et copiis. At turba longe maxima nihil ex hoc sapit, sed meritoria plane est et professoria; nisi forte quandoque eveniat, ut artifex aliquis acrioris ingenii et gloriæ cupidus novo alicui invento det operam; quod fere fit cum facultatum dispendio. At apud plerosque tantum abest ut homines id sibi proponant, ut scientiarum et artium massa augmentum obtineat, ut ex ea quæ præsto est massa nil amplius sumant aut quærant, quam quantum ad usum professorium aut lucrum aut existimationem aut hujusmodi compendia convertere possint. Quod si quis ex tanta multitudine scientiam affectu ingenuo et propter se expetat; invenietur tamen ille ipse, potius contemplationum et doctrinarum varietatem, quam veritatis severam et rigidam inquisitionem sequi. Rursus, si alius quispiam fortasse veritatis inquisitor sit severior; tamen et ille ipse talem sibi proponet veritatis conditionem, quæ menti et intellectui satisfaciat in redditione causarum rerum quæ jampridem sunt cognitæ; non eam quæ nova operum pignora et novam axiomatum lucem assequatur. Itaque, si finis scientiarum a nemine adhuc bene positus sit, non mirum est si in iis quæ sunt subordinata ad finem, sequatur aberratio.

LXXXII.

Quemadmodum autem finis et meta scientiarum male posita sunt apud homines; ita rursus etiamsi illa recte posita fuissent, viam tamen sibi delegerunt omnino erroneam et imperviam. Quod stupore quodam animum rite rem reputanti perculserit; non ulli mortalium curæ aut cordi fuisse, ut intellectui humano, ab ipso sensu et experientia ordinata et bene condita, via aperiretur et muniretur; sed omnia vel traditionum caligini, vel argumentorum vertigini et turbini, vel casus et experientiæ vagæ et inconditæ undis et ambagibus permissa esse. Atque cogitet quis sobrie et diligenter, qualis sit ea via quam in inquisitione et inventione alicujus rei homines adhibere consueverunt; et primo notabit proculdubio inveniendi modum simplicem et inartificiosum, qui hominibus maxime est familiaris. Hic autem non alius est, quam ut is qui se ad inveniendum aliquid comparat et accingit, primo quæ ab aliis circa illa dicta sint inquirat et evolvat; deinde propriam meditationem addat, atque per mentis multam agitationem spiritum suum proprium sollicitet, et quasi invocet, ut sibi oracula pandat; quæ res omnino sine fundamento est, et in opinionibus tantum volvitur.

At alius quispiam dialecticam ad inveniendum advocet, quæ nomine tenus tantum ad id quod agitur pertinet. Inventio enim dialecticæ non est principiorum et axiomatum præcipuorum, ex quibus artes constant, sed eorum tantum quæ illis consentanea videntur. Dialectica enim magis curiosos et importunos, et sibi negotium facessentes, eamque interpellantes de probationibus et inventionibus principiorum sive axiomatum primorum, ad fidem, et veluti sacramentum cuilibet arti præstandum, notissimo responso rejicit.

Restat experientia mera, quæ, si occurrat, casus; si quæsita sit, experimentum nominatur. Hoc autem experientiæ genus nihil aliud est, quam (quod aiunt) scopæ dissolutæ[1], et mera palpatio, quali homines noctu utuntur, omnia pertentando, si forte in rectam viam incidere detur; quibus multo satius et consultius foret diem præstolari, aut lumen accendere, et

[1] *i. e.* a besom without a band. "Scopas dissolvere proverbio dicitur, rem aliquam prorsus inutilem reddere; nam scopæ solutæ nullæ sunt."—*Facciolati.* I do not remember any proverbial expression which answers to this in English; but the allusion is to the want of combination and coherency in these experiments. They are the "Experimenta omnigena absque ulla serie aut methodo tentata" (*De Augm.* v. 2.), and are opposed to the "Experientia Literata," or "Experientia certa lege procedens seriatim et continenter," spoken of in aphorisms 100. and 103.—*J. S.*

deinceps viam inire. At contra, verus experientiæ ordo primo lumen accendit, deinde per lumen iter demonstrat, incipiendo ab experientia ordinata et digesta, et minime præpostera aut erratica, atque ex ea educendo axiomata, atque ex axiomatibus constitutis rursus experimenta nova; quum nec verbum divinum in rerum massam absque ordine operatum sit.

Itaque desinant homines mirari si spatium scientiarum non confectum sit, cum a via omnino aberraverint; relicta prorsus et deserta experientia, aut in ipsa (tanquam in labyrintho) se intricando et circumcursando; cum rite institutus ordo per experientiæ sylvas ad aperta axiomatum tramite constanti ducat.

LXXXIII.

Excrevit autem mirum in modum istud malum, ex opinione quadam sive æstimatione inveterata, verum tumida et damnosa; minui nempe mentis humanæ majestatem, si experimentis, et rebus particularibus sensui subjectis et in materia determinatis, diu ac multum versetur: præsertim quum hujusmodi res ad inquirendum laboriosæ, ad meditandum ignobiles, ad dicendum asperæ, ad practicam illiberales, numero infinitæ, et subtilitate tenues esse soleant. Itaque jam tandem huc res rediit, ut via vera non tantum deserta, sed etiam interclusa et obstructa sit; fastidita experientia, nedum relicta, aut male administrata.

LXXXIV.

Rursus vero homines a progressu in scientiis detinuit et fere incantavit reverentia antiquitatis, et virorum qui in philosophia magni habiti sunt authoritas, atque deinde consensus. Atque de consensu superius dictum est.

De antiquitate autem, opinio quam homines de ipsa fovent negligens omnino est, et vix verbo ipsi congrua. Mundi enim senium et grandævitas pro antiquitate vere habenda sunt; quæ temporibus nostris tribui debent, non juniori ætati mundi, qualis apud antiquos fuit. Illa enim ætas, respectu nostri antiqua et major[1], respectu mundi ipsius nova et minor fuit. Atque revera quemadmodum majorem rerum humanarum notitiam et maturius judicium ab homine sene exspectamus quam a juvene, propter experientiam et rerum quas vidit et audivit et cogitavit varietatem et copiam; eodem modo et a nostra ætate (si vires suas nosset, et experiri et intendere vellet) majora multo quam a priscis temporibus expectari par est; utpote ætate mundi grandiore, et infinitis experimentis et observationibus aucta et cumulata.

[1] See note on De Augm. lib. I. near the middle.

Neque pro nihilo æstimandum, quod per longinquas navigationes et peregrinationes (quæ sæculis nostris increbuerunt) plurima in natura patuerint et reperta sint, quæ novam philosophiæ lucem immittere possint. Quin et turpe hominibus foret, si globi materialis tractus, terrarum videlicet, marium, astrorum, nostris temporibus immensum aperti et illustrati sint; globi autem intellectualis fines inter veterum inventa et angustias cohibeantur.[1]

Authores vero quod attinet, summæ pusillanimitatis est authoribus infinita tribuere, authori autem authorum atque adeo omnis authoritatis, Tempori, jus suum denegare. Recte enim Veritas Temporis filia dicitur, non Authoritatis. Itaque mirum non est si fascina ista antiquitatis et authorum et consensus, hominum virtutem ita ligaverint, ut cum rebus ipsis consuescere (tanquam maleficiati) non potuerint.

LXXXV.

Neque solum admiratio antiquitatis, authoritatis, et consensus, hominum industriam in iis quæ jam inventa sunt acquiescere compulit; verum etiam operum ipsorum admiratio, quorum copia jampridem facta est humano generi. Etenim quum quis rerum varietatem, et pulcherrimum apparatum qui per artes mechanicas ad cultum humanum congestus et introductus est, oculis subjecerit, eo certe inclinabit, ut potius ad opulentiæ humanæ admirationem quam ad inopiæ sensum accedat; minime advertens primitivas hominis observationes[2] atque naturæ operationes (quæ ad omnem illam varietatem instar animæ sunt, et primi motus) nec multas nec alte petitas esse; cætera ad patientiam hominum tantum, et subtilem et ordinatum manus vel instrumentorum motum, pertinere. Res enim (exempli gratia) subtilis est certe et accurata confectio horologiorum, talis scilicet, quæ cœlestia in rotis, pulsum animalium in motu successivo et ordinato, videatur imitari; quæ tamen res ex uno aut altero naturæ axiomate pendet.

[1] Compare Campanèlla: "Quapropter invidi sunt aut ingenio et fide in Deum exigui qui putant in Aristotele et aliis philosophis antiquis quiescendum, nec ultra quærendum: præsertim post evangelii lucem, et novi orbis ac stellarum inventionem, quâ prisci caruerunt, sicut et luce fidei quæ perficit in nobis naturam supra ethnicos non deprimit sub eorum jugo; cum eorum philosophia sit catechismus et nostra sit perfecta doctrina, teste Cyrillo: unde in mundo qui est liber Dei et sapientia [*q.* sapientiæ?] melius legere poterimus, si gratiam quæ est in nobis non negligamus." — *Apolog. pro Galileo.*

[2] "Primitivas hominis observationes" may be rendered "primary results of observation." The word *hominis* is merely used in antithesis to *naturæ* in the next clause.

Quod si quis rursus subtilitatem illam intueatur quæ ad artes liberales pertinet; aut etiam eam quæ ad corporum naturalium præparationem per artes mechanicas spectat, et hujusmodi res suspiciat; veluti inventionem motuum cœlestium in astronomia, concentuum in musica, literarum alphabeti (quæ etiam adhuc in regno Synarum in usu non sunt) in grammatica; aut rursus in mechanicis, factorum Bacchi et Cereris, hoc est, præparationum vini et cervisiæ, panificiorum, aut etiam mensæ delitiarum, et distillationum et similium; ille quoque si secum cogitet, et animum advertat, per quantos temporum circuitus (cum hæc omnia, præter distillationes [1], antiqua fuerint) hæc ad eam quam nunc habemus culturam perducta sint, et (ut jam de horologiis dictum est) quam parum habeant ex observationibus et axiomatibus naturæ, atque quam facile, et tanquam per occasiones obvias et contemplationes incurrentes, ista inveniri potuerint; ille (inquam) ab omni admiratione se facile liberabit, et potius humanæ conditionis miserebitur, quod per tot sæcula tanta fuerit rerum et inventorum penuria et sterilitas. Atque hæc ipsa tamen quorum nunc mentionem fecimus inventa, philosophia et artibus intellectus antiquiora fuerunt. Adeo ut (si verum dicendum sit) cum hujusmodi scientiæ rationales et dogmaticæ inceperint, inventio operum utilium desierit.[2]

Quod si quis ab officinis ad bibliothecas se converterit, et immensam quam videmus librorum varietatem in admiratione habuerit, is examinatis et diligentius introspectis ipsorum librorum materiis et contentis, obstupescet certe in contrarium; et postquam nullum dari finem repetitionibus observaverit, quamque homines eadem agant et loquantur, ab admiratione varietatis transibit ad miraculum indigentiæ et paucitatis earum rerum quæ hominum mentes adhuc tenuerunt et occuparunt.

Quod si quis ad intuendum ea quæ magis curiosa habentur quam sana animum submiserit, et Alchymistarum aut Magorum opera penitius introspexerit, is dubitabit forsitan utrum risu an lachrymis potius illa digna sint. Alchymista enim

[1] It has been said that Porson affirmed that distillation was known to the ancients. Dutens of course maintains that it was; but the passage he quotes from Dioscorides merely refers to sublimation. The word alembic is, as he remarks, a compound of the Arabic article with the Greek word ἄμβιξ, operculum; thus resembling in formation the word "almagest" and some others. But no valid conclusion can be drawn from hence. See Dutens, *Origine des Découvertes*, &c., p. 187. of the London edition. See a very interesting account of the history of distillation in Humboldt's *Examen critique de l'Histoire de la Géographie*, &c., vol. ii. p. 306.

[2] Thus we find Aristotle speaks of philosophy as having sprung up after all the wants of life were satisfied. See the beginning of the *Metaphysics*.

spem alit æternam, atque ubi res non succedit errores proprios reos substituit; secum accusatorie reputando, se aut artis aut authorum vocabula non satis intellexisse, unde ad traditiones et auriculares susurros animum applicat; aut in practicæ suæ scrupulis et momentis aliquid titubatum esse[1], unde experimenta in infinitum repetit; ac interim quum inter experimentorum sortes in quædam incidat aut ipsa facie nova aut utilitate non contemnenda, hujusmodi pignoribus animum pascit, eaque in majus ostentat et celebrat; reliqua spe sustentat. Neque tamen negandum est, Alchymistas non pauca invenisse et inventis utilibus homines donasse. Verum fabula illa non male in illos quadrat, de sene qui filiis aurum in vinea defossum (sed locum se nescire simulans) legaverit; unde illi vineæ fodiendæ diligenter incubuerunt, et aurum quidem nullum repertum, sed vindemia ex ea cultura facta est uberior.

At naturalis Magiæ cultores, qui per rerum Sympathias et Antipathias omnia expediunt, ex conjecturis otiosis et supinissimis, rebus virtutes et operationes admirabiles affinxerunt; atque si quando opera exhibuerint, ea illius sunt generis, ut ad admirationem et novitatem, non ad fructum et utilitatem, accommodata sint.

In superstitiosa autem Magia (si et de hac dicendum sit) illud imprimis animadvertendum est, esse tantummodo certi cujusdam et definiti generis subjecta, in quibus artes curiosæ et superstitiosæ, per omnes nationes atque ætates atque etiam religiones, aliquid potuerint aut luserint. Itaque ista missa faciamus: interim nil mirum est si opinio copiæ causam inopiæ dederit.

LXXXVI.

Atque hominum admirationi quoad doctrinas et artes, per se satis simplici et prope puerili, incrementum accessit ab eorum astu et artificio qui scientias tractaverunt et tradiderunt. Illi enim ea ambitione et affectatione eas proponunt, atque in eum modum efformatas ac veluti personatas in hominum conspectum producunt, ac si illæ omni ex parte perfectæ essent et ad exitum perductæ. Si enim methodum aspicias et partitiones, illæ prorsus omnia complecti et concludere videntur quæ in illud subjectum cadere possunt. Atque licet membra illa male impleta et veluti capsulæ inanes sint, tamen apud intellectum vulgarem scientiæ formam et rationem integræ præ se ferunt.

[1] That is, that something has gone wrong in his manipulations, either in weighing his materials, or because the moment of projection has been missed.

At primi et antiquissimi veritatis inquisitores, meliore fide et fato, cognitionem illam, quam ex rerum contemplatione decerpere et in usum recondere statuebant, in *aphorismos*, sive breves easdemque sparsas nec methodo revinctas sententias, conjicere solebant; neque se artem universam complecti simulabant aut profitebantur. At eo quo nunc res agitur modo, minime mirum est si homines in iis ulteriora non quærant, quæ pro perfectis et numeris suis jampridem absolutis traduntur.

LXXXVII.

Etiam antiqua magnum existimationis et fidei incrementum acceperunt, ex eorum vanitate et levitate qui nova proposuerunt; præsertim in Philosophiæ Naturalis parte activa et operativa. Neque enim defuerunt homines vaniloqui et phantastici, qui partim ex credulitate, partim ex impostura, genus humanum promissis onerarunt: vitæ prolongationem, senectutis retardationem, dolorum levationem, naturalium defectuum reparationem, sensuum deceptiones, affectuum ligationes et incitationes, intellectualium facultatum illuminationes et exaltationes, substantiarum transmutationes, et motuum ad libitum roborationes et multiplicationes, aëris impressiones et alterationes, cœlestium influentiarum deductiones et procurationes, rerum futurarum divinationes, remotarum repræsentationes, occultarum revelationes, et alia complura pollicitando et ostentando. Verum de istis largitoribus non multum aberraverit qui istiusmodi judicium fecerit, tantum nimirum in doctrinis philosophiæ inter horum vanitates et veras artes interesse, quantum inter res gestas Julii Cæsaris aut Alexandri Magni et res gestas Amadicii ex Gallia aut Arthuri ex Britannia in historiæ narrationibus intersit. Inveniuntur enim clarissimi illi imperatores revera majora gessisse quam umbratiles isti heroes etiam fecisse fingantur; sed modis et viis scilicet actionum minime fabulosis et prodigiosis. Neque propterea æquum est veræ memoriæ fidem derogari, quod a fabulis illa quandoque læsa sit et violata. Sed interim minime mirum est si propositionibus novis (præsertim cum mentione operum) magnum sit factum præjudicium per istos impostores qui similia tentaverunt; cum vanitatis excessus et fastidium etiam nunc omnem in ejusmodi conatibus magnanimitatem destruxerit.

LXXXVIII.

At longe majora a pusillanimitate, et pensorum quæ humana industria sibi proposuit parvitate et tenuitate, detrimenta in

scientias invecta sunt. Et tamen (quod pessimum est) pusillanimitas ista non sine arrogantia et fastidio se offert.

Primum enim, omnium artium illa reperitur cautela jam facta familiaris, ut in qualibet arte authores artis suæ infirmitatem in naturæ calumniam vertant; et quod ars ipsorum non assequitur id ex eadem arte impossibile in natura pronunciant. Neque certe damnari potest ars, si ipsa judicet. Etiam philosophia quæ nunc in manibus est, in sinu suo posita quædam fovet, aut placita, quibus (si diligentius inquiratur) hoc hominibus omnino persuaderi volunt; nil ab arte vel hominis opere arduum, aut in naturam imperiosum et validum, expectari debere; ut de heterogenia caloris astri et ignis, et mistione, superius dictum est. Quæ si notentur accuratius, omnino pertinent ad humanæ potestatis circumscriptionem malitiosam, et ad quæsitam et artificiosam desperationem, quæ non solum spei auguria turbet, sed etiam omnes industriæ stimulos et nervos incidat atque ipsius experientiæ aleas abjiciat; dum de hoc tantum solliciti sint, ut ars eorum perfecta censeatur; gloriæ vanissimæ et perditissimæ dantes operam, scilicet ut quicquid adhuc inventum et comprehensum non sit, id omnino nec inveniri nec comprehendi posse in futurum credatur. At si quis rebus addere se[1] et novum aliquod reperire conetur, ille tamen omnino sibi proponet et destinabit unum aliquod inventum (nec ultra) perscrutari et eruere; ut magnetis naturam, maris fluxum et refluxum, thema cœli, et hujusmodi, quæ secreti aliquid habere videntur et hactenus parum fœliciter tractata sint: quum summæ sit imperitiæ, rei alicujus naturam in se ipsa perscrutari; quandoquidem eadem natura, quæ in aliis videtur latens et occulta, in aliis manifesta sit et quasi palpabilis, atque in illis admirationem, in his ne attentionem quidem moveat; ut fit in natura consistentiæ, quæ in ligno vel lapide non notatur, sed solidi appellatione transmittitur, neque amplius de fuga separationis aut solutionis continuitatis inquiritur: at in aquarum bullis eadem res videtur subtilis et ingeniosa; quæ bullæ se conjiciunt in pelliculas quasdam in hemisphærii formam curiose effictas, ut ad momentum temporis evitetur solutio continuitatis.

[1] Compare Redargutio Philosophiarum, — "Quare missis istis philosophiis abstractis, vos et ego, filii, *rebus ipsis nos adjungamus*:" and Præfatio, p. 127. of this volume, — "Qui autem et ipsi experiri et *se scientiis addere*, earumque fines proferre, statuerunt, nec illi a receptis prorsus desciscere ausi sunt," &c. "*Addere se*" (says Heyne, Virg. Georg. i. 513.) "vulgari usu est adjungere se, accedere. . . . Inde si idem fit cum impetu, irruere, instare, ἐπέχειν."—*J. S.*

Atque prorsus illa ipsa quæ habentur pro secretis, in aliis habent naturam manifestam et communem; quæ nunquam se dabit conspiciendam, si hominum experimenta aut contemplationes in illis ipsis tantum versentur. Generaliter autem et vulgo, in operibus mechanicis habentur pro novis inventis, si quis jampridem inventa subtilius poliat, vel ornet elegantius, vel simul uniat et componat, vel cum usu commodius copulet, aut opus majore aut etiam minore quam fieri consuevit mole vel volumine exhibeat, et similia.

Itaque minime mirum est si nobilia et genere humano digna inventa in lucem extracta non sint, quum homines hujusmodi exiguis pensis et puerilibus contenti et delectati fuerint; quinetiam in iisdem se magnum aliquod sequutos aut assequutos putaverint.

LXXXIX.

Neque illud prætermittendum est, quod nacta sit Philosophia Naturalis per omnes ætates adversarium molestum et difficilem; superstitionem nimirum, et zelum religionis cæcum et immoderatum. Etenim videre est apud Græcos, eos qui primum causas naturales fulminis et tempestatum insuetis adhuc hominum auribus proposuerunt, impietatis in deos eo nomine damnatos: nec multo melius a nonnullis antiquorum patrum religionis christianæ exceptos fuisse eos, qui ex certissimis demonstrationibus (quibus nemo hodie sanus contradixerit) terram rotundam esse posuerunt, atque ex consequenti antipodas esse asseruerunt.

Quinetiam ut nunc sunt res, conditio sermonum de natura facta est durior et magis cum periculo, propter theologorum scholasticorum summas et methodos; qui cum theologiam (satis pro potestate) in ordinem redegerint et in artis formam effinxerint, hoc insuper effecerunt, ut pugnax et spinosa Aristotelis philosophia corpori religionis plus quam par erat immisceretur.[1]

Eodem etiam spectant (licet diverso modo) eorum commentationes, qui veritatem christianæ religionis ex principiis et authoritatibus philosophorum deducere et confirmare haud veriti sunt; fidei et sensus conjugium tanquam legitimum multa

[1] Compare Kepler in the introduction to his great work *De Stellâ Martis*: — "In theologiâ quidem authoritatum, in Philosophiâ vero rationum esse momenta ponderanda. Sanctus igitur Lactantius qui terram negavit esse rotundam: Sanctus Augustinus qui rotunditate concessâ negavit tamen Antipodas: Sanctum Officium hodiernorum qui exilitate terræ concessâ negant tamen ejus motum: at magis mihi sancta Veritas qui terram et rotundam et Antipodibus circumhabitam et contemptissimæ parvitatis esse et denique per sidera ferri, salvo Doctorum ecclesiæ respectu, ex philosophiâ demonstro." See for a defence of St. Boniface, touching the story of the Antipodes and Virgilius Bishop of Saltzburg, Fromondus *De Orbe Terræ Immobili*, c. 4."

pompa et solennitate celebrantes, et grata rerum varietate animos hominum permulcentes; sed interim divina humanis impari conditione permiscentes. At in hujusmodi misturis theologiæ cum philosophia, ea tantum quæ nunc in philosophia recepta sunt comprehenduntur; sed nova, licet in melius mutata, tantum non summoventur et exterminantur.

Denique invenias ex quorundam theologorum imperitia aditum alicui philosophiæ, quamvis emendatæ, pene interclusum esse. Alii siquidem simplicius subverentur ne forte altior in naturam inquisitio ultra concessum sobrietatis terminum penetret; traducentes et perperam torquentes ea quæ de divinis mysteriis in scripturis sacris adversus rimantes secreta divina dicuntur, ad occulta naturæ quæ nullo interdicto prohibentur. Alii callidius conjiciunt et animo versant, si media ignorentur, singula ad manum et virgulam divinam (quod religionis ut putant maxime intersit) facilius posse referri: quod nihil aliud est quam *Deo per mendacium gratificari velle.* Alii ab exemplo metuunt, ne motus et mutationes circa philosophiam in religionem incurrant ac desinant. Alii denique solliciti videntur, ne in naturæ inquisitione aliquid inveniri possit quod religionem (præsertim apud indoctos) subvertat, aut saltem labefactet. At isti duo posteriores metus nobis videntur omnino sapientiam animalem sapere; ac si homines, in mentis suæ recessibus et secretis cogitationibus, de firmitudine religionis et fidei in sensum imperio diffiderent ac dubitarent; et propterea ab inquisitione veritatis in naturalibus periculum illis impendere metuerent. At vere rem reputanti Philosophia Naturalis, post verbum Dei, certissima superstitionis medicina est; eademque probatissimum fidei alimentum. Itaque merito religioni donatur tanquam fidissima ancilla: cum altera voluntatem Dei, altera potestatem manifestet. Neque enim erravit ille qui dixit, *Erratis, nescientes scripturas et potestatem Dei*[1]: informationem de voluntate et meditationem de potestate nexu individuo commiscens et copulans. Interim minus mirum est si Naturalis Philosophiæ incrementa cohibita sint, cum religio, quæ plurimum apud animos hominum pollet, per quorundam imperitiam et zelum incautum in partem contrariam transierit et abrepta fuerit.

XC.

Rursus in moribus et institutis scholarum, academiarum, collegiorum, et similium conventuum, quæ doctorum hominum

[1] Matt. xxii. 29.

sedibus et eruditionis culturæ destinata sunt, omnia progressui scientiarum adversa inveniuntur. Lectiones enim et exercitia ita sunt disposita, ut aliud a consuetis haud facile cuiquam in mentem veniat cogitare aut contemplari. Si vero unus aut alter fortasse judicii libertate uti sustinuerit, is sibi soli hanc operam imponere possit; ab aliorum autem consortio nihil capiet utilitatis. Sin et hoc toleraverit, tamen in capessenda fortuna industriam hanc et magnanimitatem sibi non levi impedimento fore experietur. Studia enim hominum in ejusmodi locis in quorundam authorum scripta, veluti in carceres, conclusa sunt; a quibus si quis dissentiat, continuo ut homo turbidus et rerum novarum cupidus corripitur. At magnum certe discrimen inter res civiles et artes: non enim idem periculum a novo motu et a nova luce. Verum in rebus civilibus mutatio etiam in melius suspecta est ob perturbationem; cum civilia auctoritate, consensu, fama, et opinione, non demonstratione, nitantur. In artibus autem et scientiis, tanquam in metalli-fodinis, omnia novis operibus et ulterioribus progressibus circumstrepere debent. Atque secundum rectam rationem res ita se habet, sed interim non ita vivitur; sed ista, quam diximus, doctrinarum administratio et politia scientiarum augmenta durius premere consuevit.

XCI.

Atque insuper licet ista invidia cessaverit; tamen satis est ad cohibendum augmentum Scientiarum, quod hujusmodi conatus et industriæ præmiis careant. Non enim penes eosdem est cultura scientiarum et præmium. Scientiarum enim augmenta a magnis utique ingeniis proveniunt; at pretia et præmia scientiarum sunt penes vulgus aut principes viros, qui (nisi raro admodum) vix mediocriter docti sunt. Quinetiam hujusmodi progressus non solum præmiis et beneficentia hominum, verum etiam ipsa populari laude, destituti sunt. Sunt enim illi supra captum maximæ partis hominum, et ab opinionum vulgarium ventis facile obruuntur et extinguuntur. Itaque nil mirum si res illa non fœliciter successerit, quæ in honore non fuit.

XCII.

Sed longe maximum progressibus scientiarum et novis pensis ac provinciis in iisdem suscipiendis obstaculum deprehenditur in desperatione hominum, et suppositione Impossibilis. Solent enim viri prudentes et severi in hujusmodi rebus plane diffidere: naturæ obscuritatem, vitæ brevitatem, sensuum fallacias, judicii infirmitatem, experimentorum difficultates, et similia secum

reputantes. Itaque existimant esse quosdam scientiarum, per temporum et ætatum mundi revolutiones, fluxus et refluxus; cum aliis temporibus crescant et floreant, aliis declinent et jaceant: ita tamen, ut cum ad certum quendam gradum et statum pervenerint, nil ulterius possint.

Itaque si quis majora credat aut spondeat, id putant esse cujusdam impotentis et immaturi animi; atque hujusmodi conatus, initia scilicet læta, media ardua, extrema confusa habere. Atque cum hujusmodi cogitationes eæ sint quæ in viros graves et judicio præstantes facile cadant, curandum revera est ne rei optimæ et pulcherrimæ amore capti severitatem judicii relaxemus aut minuamus; et sedulo videndum quid spei affulgeat, et ex qua parte se ostendat; atque auris levioribus spei rejectis, eæ quæ plus firmitudinis habere videntur omnino discutiendæ sunt et pensitandæ. Quinetiam prudentia civilis ad consilium vocanda est et adhibenda, quæ ex præscripto diffidit, et de rebus humanis in deterius conjicit. Itaque jam et de spe dicendum est; præsertim cum nos promissores non simus, nec vim aut insidias hominum judiciis faciamus aut struamus, sed homines manu et sponte ducamus. Atque licet longe potentissimum futurum sit remedium ad spem imprimendam, quando homines ad particularia, præsertim in Tabulis nostris Inveniendi digesta et disposita (quæ partim ad secundam, sed multo magis ad quartam Instaurationis nostræ partem pertinent), adducemus; cum hoc ipsum sit non spes tantum, sed tanquam res ipsa: tamen ut omnia clementius fiant, pergendum est in instituto nostro de præparandis hominum mentibus; cujus præparationis ista ostensio spei pars est non exigua. Nam absque ea, reliqua faciunt magis ad contristationem hominum (scilicet ut deteriorem et viliorem habeant de iis quæ jam in usu sunt opinionem quam nunc habent, et suæ conditionis infortunium plus sentiant et pernoscant), quam ad alacritatem aliquam inducendam, aut industriam experiendi acuendam. Itaque conjecturæ nostræ, quæ spem in hac re faciunt probabilem, aperiendæ sunt et præponendæ: sicut Columbus fecit, ante navigationem illam suam mirabilem maris Atlantici, cum rationes adduxerit cur ipse novas terras et continentes, præter eas quæ ante cognitæ fuerunt, inveniri posse confideret: quæ rationes, licet primo rejectæ, postea tamen experimento probatæ sunt et rerum maximarum causæ et initia fuerunt.

XCIII.

Principium autem sumendum a Deo[1]: hoc nimirum quod agitur, propter excellentem in ipso boni naturam, manifeste a Deo esse, qui author boni et pater luminum est. In operationibus autem divinis, initia quæque tenuissima exitum certo trahunt. Atque quod de spiritualibus dictum est, *regnum Dei non venit cum observatione*, id etiam in omni majore opere providentiæ divinæ evenire reperitur; ut omnia sine strepitu et sonitu placide labantur, atque res plane agatur priusquam homines eam agi putent aut advertant. Neque omittenda est prophetia Danielis de ultimis mundi temporibus: *Multi pertransibunt et multiplex erit scientia:* manifeste innuens et significans esse in fatis, id est in providentia, ut pertransitus mundi (qui per tot longinquas navigationes impletus plane aut jam in opere esse videtur) et augmenta scientiarum in eandem ætatem incidant.

XCIV.

Sequitur ratio omnium maxima ad faciendam spem; nempe ex erroribus temporis præteriti et viarum adhuc tentatarum. Optima enim est ea reprehensio, quam de statu civili haud prudenter administrato quispiam his verbis complexus est: *Quod ad præterita pessimum est, id ad futura optimum videri debet. Si enim vos omnia quæ ad officium vestrum spectant præstitissetis, neque tamen res vestræ in meliore loco essent, ne spes quidem ulla reliqua foret eas in melius provehi posse. Sed cum rerum vestrarum status non a vi ipsa rerum sed ab erroribus vestris male se habeat, sperandum est, illis erroribus missis aut correctis, magnam rerum in melius mutationem fieri posse.*[2] Simili modo, si homines per tanta annorum spatia viam inveniendi et colendi scientias tenuissent, nec tamen ulterius progredi potuissent, audax proculdubio et temeraria foret opinio, posse rem in ulterius provehi. Quod si in via ipsa erratum sit, atque hominum opera in iis consumpta in quibus minime oportebat, sequitur ex eo, non in rebus ipsis difficultatem oriri, quæ potestatis nostræ non sunt, sed in intellectu humano ejusque usu et applicatione, quæ res remedium et medicinam suscipit. Itaque optimum fuerit illos ipsos errores proponere: quot enim fuerint errorum impedimenta in præterito, tot sunt spei argumenta in futurum. Ea vero licet in

[1] Ἐκ Διὸς ἀρχώμεσθα.— Aratus, Phænom. l. 1.
[2] Demosthenes: see the first Philippic, p. 40.; and the third, p. 112. Ed. Reisk.

his quæ superius dicta sunt non intacta omnino fuerint, tamen ea etiam nunc breviter verbis nudis ac simplicibus repræsentare visum est.

XCV.

Qui tractaverunt scientias aut Empirici aut Dogmatici fuerunt. Empirici, formicæ more, congerunt tantum et utuntur; Rationales, aranearum more, telas ex se conficiunt[1]: apis vero ratio media est, quæ materiam ex floribus horti et agri elicit, sed tamen eam propria facultate vertit et digerit. Neque absimile philosophiæ verum opificium est; quod nec mentis viribus tantum aut præcipue nititur, neque ex historia naturali et mechanicis experimentis præbitam materiam, in memoria integram, sed in intellectu mutatam et subactam, reponit. Itaque ex harum facultatum (experimentalis scilicet et rationalis) arctiore et sanctiore fœdere (quod adhuc factum non est) bene sperandum est.

XCVI.

Naturalis Philosophia adhuc sincera non invenitur, sed infecta et corrupta: in Aristotelis schola per logicam, in Platonis schola per theologiam naturalem; in secunda schola Platonis, Procli et aliorum, per mathematicam; quæ philosophiam naturalem terminare, non generare aut procreare debet. At ex philosophia naturali pura et impermista meliora speranda sunt.

XCVII.

Nemo adhuc tanta mentis constantia et rigore inventus est, ut decreverit et sibi imposuerit, theorias et notiones communes penitus abolere, et intellectum abrasum et æquum ad particularia de integro applicare. Itaque ratio illa humana quam habemus, ex multa fide et multo etiam casu, nec non ex puerilibus quas primo hausimus notionibus, farrago quædam est et congeries.

Quod si quis ætate matura et sensibus integris et mente repurgata se ad experientiam et ad particularia de integro applicet, de eo melius sperandum est. Atque hac in parte nobis spondemus fortunam Alexandri Magni: neque quis nos vanitatis arguat, antequam exitum rei audiat, quæ ad exuendam omnem vanitatem spectat.

Etenim de Alexandro et ejus rebus gestis Æschines ita loquutus est: *Nos certe vitam mortalem non vivimus; sed in*

[1] Ἀρίστων τοὺς λόγους τῶν διαλεκτικῶν τοῖς τῶν ἀραχνίων ὑφάσμασιν εἴκαζεν, οὐδὲν μὲν χρησίμους, λίαν δὲ τεχνικούς (perhaps χρησίμοις and τεχνικοῖς).— Stobæus, Floril. § 82. Compare *De Augmentis*, v. 2.

hoc nati sumus, ut posteritas de nobis portenta narret et prædicet: perinde ac si Alexandri res gestas pro miraculo habuisset.[1]

At ævis sequentibus Titus Livius melius rem advertit et introspexit, atque de Alexandro hujusmodi quippiam dixit: *Eum non aliud quam bene ausum vana contemnere.*[2] Atque simile etiam de nobis judicium futuris temporibus factum iri existimamus: *nos nil magni fecisse, sed tantum ea quæ pro magnis habentur minoris fecisse.* Sed interim (quod jam diximus) non est spes nisi in *regeneratione* scientiarum; ut eæ scilicet ab Experientia certo ordine excitentur et rursus condantur: quod adhuc factum esse aut cogitatum nemo (ut arbitramur) affirmaverit.

XCVIII.

Atque Experientiæ fundamenta (quando ad hanc omnino deveniendum est) aut nulla aut admodum infirma adhuc fuerunt; nec particularium sylva et materies, vel numero vel genere vel certitudine, informando intellectui competens aut ullo modo sufficiens, adhuc quæsita est et congesta. Sed contra homines docti (supini sane et faciles) rumores quosdam Experientiæ, et quasi famas et auras ejus, ad philosophiam suam vel constituendam vel confirmandam exceperunt, atque illis nihilominus pondus legitimi testimonii attribuerunt. Ac veluti si regnum aliquod aut status non ex literis et relationibus a legatis et nuntiis fide-dignis missis, sed ex urbanorum sermunculis et ex triviis, consilia sua et negotia gubernaret; omnino talis in philosophiam administratio, quatenus ad Experientiam, introducta est. Nil debitis modis exquisitum, nil verificatum, nil numeratum, nil appensum, nil dimensum in Naturali Historia reperitur. At quod in observatione indefinitum et vagum, id in informatione fallax et infidum est. Quod si cui hæc mira dictu videantur et querelæ minus justæ propiora, cum Aristoteles, tantus ipse vir et tanti regis opibus subnixus, tam accuratam de Animalibus historiam confecerit, atque alii nonnulli majore diligentia (licet strepitu minore) multa adjecerint, et rursus alii de plantis, de metallis, et fossilibus, historias et narrationes copiosas conscripserint; is sane non satis attendere et perspicere videtur quid agatur in præsentia. Alia enim est ratio Naturalis Historiæ quæ propter se confecta est; alia ejus quæ collecta est ad in-

[1] Æschines, De Coronâ, p. 72. Ed. H. Stephan.
[2] Lib. ix. c. 17.

formandum intellectum in ordine ad condendam philosophiam. Atque hæ duæ historiæ tum aliis rebus, tum præcipue in hoc differunt; quod prima ex illis specierum naturalium varietatem, non artium mechanicarum experimenta, contineat. Quemadmodum enim in civilibus ingenium cujusque et occultus animi affectuumque sensus melius elicitur cum quis in perturbatione ponitur, quam alias: simili modo, et occulta naturæ magis se produnt per vexationes artium, quam cum cursu suo meant. Itaque tum demum bene sperandum est de Naturali Philosophia, postquam Historia Naturalis (quæ ejus basis est et fundamentum) melius instructa fuerit; antea vero minime.

XCIX.

Atque rursus in ipsa experimentorum mechanicorum copia, summa eorum quæ ad intellectus informationem maxime faciunt et juvant detegitur inopia. Mechanicus enim, de veritatis inquisitione nullo modo sollicitus, non ad alia quam quæ operi suo subserviunt aut animum erigit aut manum porrigit. Tum vero de scientiarum ulteriore progressu spes bene fundabitur, quum in Historiam Naturalem recipientur et aggregabuntur complura experimenta, quæ in se nullius sunt usus, sed ad inventionem causarum et axiomatum tantum faciunt; quæ nos *lucifera* experimenta, ad differentiam *fructiferorum*, appellare consuevimus. Illa autem miram habent in se virtutem et conditionem; hanc videlicet, quod nunquam fallant aut frustrentur. Cum enim ad hoc adhibeantur, non ut opus aliquod efficiant sed ut causam naturalem in aliquo revelent, quaquaversum cadunt, intentioni æque satisfaciunt; cum quæstionem terminent.

C.

At non solum copia major experimentorum quærenda est et procuranda, atque etiam alterius generis, quam adhuc factum est; sed etiam methodus plane alia et ordo et processus continuandæ et provehendæ Experientiæ introducenda. Vaga enim Experientia et se tantum sequens (ut superius dictum est) mera palpatio est, et homines potius stupefacit quam informat. At cum Experientia lege certa procedet, seriatim et continenter, de scientiis aliquid melius sperari poterit.

CI.

Postquam vero copia et materies Historiæ Naturalis et Experientiæ, talis qualis ad opus intellectus sive ad opus philosophicum requiritur, præsto jam sit et parata; tamen nullo modo sufficit intellectus, ut in illam materiem agat sponte et memoriter;

non magis, quam si quis computationem alicujus ephemeridis memoriter se tenere et superare posse speret. Atque hactenus tamen potiores meditationis partes quam scriptionis in inveniendo fuerunt; neque adhuc Experientia literata[1] facta est: atqui nulla nisi de scripto inventio probanda est. Illa vero in usum inveniente, ab Experientia facta demum literata melius sperandum.

CII.

Atque insuper cum tantus sit particularium numerus et quasi exercitus, isque ita sparsus et diffusus, ut intellectum disgreget et confundat, de velitationibus et levibus motibus et transcursibus intellectus non bene sperandum est; nisi fiat instructio et coordinatio, per tabulas inveniendi idoneas et bene dispositas et tanquam vivas, eorum quæ pertinent ad subjectum in quo versatur inquisitio, atque ad harum tabularum auxilia præparata et digesta mens applicetur.

CIII.

Verum post copiam particularium rite et ordine veluti sub oculos positorum, non statim transeundum est ad inquisitionem et inventionem novorum particularium aut operum; aut saltem, si hoc fiat, in eo non acquiescendum. Neque enim negamus, postquam omnia omnium artium experimenta collecta et digesta fuerint atque ad unius hominis notitiam et judicium pervenerint, quin ex ipsa traductione experimentorum unius artis in alias multa nova inveniri possint ad humanam vitam et statum utilia, per istam Experientiam quam vocamus Literatam[2]; sed tamen minora de ea speranda sunt; majora vero a nova luce Axiomatum ex particularibus illis certa via et regula eductorum, quæ rursus nova particularia indicent et designent. Neque enim in plano via sita est, sed ascendendo et descendendo; ascendendo primo ad Axiomata, descendendo ad Opera.

CIV.

Neque tamen permittendum est, ut intellectus a particulari-

[1] "Experientia literata" does not appear to be used here in the same sense as in Aph. 103., or in the *De Augmentis*, v. 2.: "Cum quis experimenta omnigena absque ullâ serie aut methodo tentet, ea demum mera est palpatio: cum vero nonnullâ utatur in experimentando directione et ordine, perinde est ac si manu ducatur. Atque hoc ipsum est quod per Experientiam Literatam intelligimus." Here it is used merely for a mode of experimenting in which the results are recorded in writing. The "experientia literata" of the *De Augmentis* answers to the "experientia certâ lege procedens" of the last aphorism.—*J. S.*

[2] Here "experientia literata" is the same as in the *De Augmentis*. See the last note.—*J. S.*

bus ad axiomata remota et quasi generalissima (qualia sunt principia, quæ vocant, artium et rerum) saliat et volet; et ad eorum immotam veritatem axiomata media probet et expediat: quod adhuc factum est, prono ad hoc impetu naturali intellectus, atque etiam ad hoc ipsum, per demonstrationes quæ fiunt per syllogismum, jampridem edocto et assuefacto. Sed de scientiis tum demum bene sperandum est, quando per scalam veram, et per gradus continuos et non intermissos aut hiulcos, a particularibus ascendetur ad axiomata minora, et deinde ad media, alia aliis superiora, et postremo demum ad generalissima. Etenim axiomata infima non multum ab experientia nuda discrepant. Suprema vero illa et generalissima (quæ habentur) notionalia sunt et abstracta, et nil habent solidi. At media sunt axiomata illa vera et solida et viva, in quibus humanæ res et fortunæ sitæ sunt; et supra hæc quoque, tandem ipsa illa generalissima; talia scilicet quæ non abstracta sint, sed per hæc media vere limitantur.[1]

Itaque hominum intellectui non plumæ addendæ, sed plumbum potius et pondera; ut cohibeant omnem saltum et volatum. Atque hoc adhuc factum non est; quum vero factum fuerit, melius de scientiis sperare licebit.

CV.

In constituendo autem axiomate, forma Inductionis alia quam adhuc in usu fuit excogitanda est; eaque non ad principia tantum (quæ vocant) probanda et invenienda, sed etiam ad axiomata minora et media, denique omnia. Inductio enim quæ procedit per enumerationem simplicem res puerilis est, et precario concludit, et periculo exponitur ab instantia contradictoria, et plerumque secundum pauciora quam par est, et ex his tantummodo quæ præsto sunt, pronunciat. At Inductio quæ ad inventionem et demonstrationem scientiarum et artium erit utilis naturam separare debet, per rejectiones et exclusiones debitas; ac deinde, post negativas tot quot sufficiunt, super affirmativas concludere; quod adhuc factum non est, nec tentatum certe, nisi tantummodo a Platone, qui ad excutiendas definitiones et ideas, hac certe forma inductionis aliquatenus utitur.[2] Verum

[1] That is, of which these intermediate axioms are really limitations, *i. e.* particular cases.

[2] This is one of many passages which show that Bacon was very far from asserting that he was the first to propose an inductive method. It is remarkable that M. de St. Hilaire in his translation of the treatise *De Animâ* of Aristotle has repeated the popular assertion that Bacon claimed to be the first discoverer of induction.

ad hujus inductionis, sive demonstrationis, instructionem bonam et legitimam, quamplurima adhibenda sunt quæ adhuc nullius mortalium cogitationem subiere; adeo ut in ea major sit consumenda opera, quam adhuc consumpta est in syllogismo. Atque hujus inductionis auxilio, non solum ad axiomata invenienda, verum etiam ad notiones terminandas, utendum est.[1] Atque in hac certè Inductione spes maxima sita est.

CVI.

At in axiomatibus constituendis per hanc inductionem, examinatio et probatio etiam facienda est, utrum quod constituitur axioma aptatum sit tantum et ad mensuram factum eorum particularium ex quibus extrahitur; an vero sit amplius et latius. Quod si sit amplius aut latius, videndum an eam suam amplitudinem et latitudinem per novorum particularium designationem, quasi fide-jussione quadam, firmet[2]; ne vel in jam notis tantum hæreamus, vel laxiore fortasse complexu umbras et formas abstractas, non solida et determinata in materia, prensemus. Hæc vero cum in usum venerint, solida tum demum spes merito affulserit.

CVII.

Atque hic etiam resumendum est, quod superius dictum est de Naturali Philosophia producta, et scientiis particularibus ad eam reductis, ut non fiat scissio et truncatio scientiarum; nam etiam absque hoc minus de progressu sperandum est.

CVIII.

Atque de desperatione tollenda et spe facienda, ex præteriti temporis erroribus valere jussis aut rectificatis, jam dictum est. Videndum autem et si quæ alia sint quæ spem faciant. Illud vero occurrit; si hominibus non quærentibus, et aliud agentibus,

[1] "Ad notiones terminandas" may be rendered "in order to the formation of conceptions." This passage, especially when compared with the 14th Aphorism, shows that Bacon contemplated a twofold application of induction, though he has left nothing on the subject of the formation of conceptions.

[2] The meaning of this will be made clearer by comparing it with the following passage in *Valerius Terminus*: —

"That the discovery of new works or active directions not known before is the only trial to be accepted of; and yet not that neither in case where one particular giveth light to another, but where particulars induce an axiom or observation, which axiom found out discovereth and designeth new particulars. That the nature of this trial is not only on the point whether the knowledge be profitable or no, but even upon the point whether the knowledge be true or no. Not because you may always conclude that the axiom which discovereth new instances is true; but contrariwise you may safely conclude that, if you discover not any new instance, it is vain and untrue. That by new instances are not always to be understood new recipes, but new assignations; and of the diversity between these two."—*Val. Ter.*, abridgment of the 12th chapter of the first book. *J. S.*

multa utilia, tanquam casu quodam aut per occasionem, inventa sint; nemini dubium esse posse, quin iisdem quærentibus et hoc agentibus, idque via et ordine, non impetu et desultorie, longe plura detegi necesse sit. Licet enim semel aut iterum accidere possit, ut quispiam in id forte fortuna incidat, quod magno conatu et de industria scrutantem antea fugit; tamen in summa rerum proculdubio contrarium invenitur. Itaque longe plura et meliora, atque per minora intervalla, a ratione et industria et directione et intentione hominum speranda sunt, quam a casu et instinctu animalium et hujusmodi, quæ hactenus principium inventis dederunt.

CIX.

Etiam illud ad spem trahi possit, quod nonnulla ex his quæ jam inventa sunt ejus sint generis ut antequam invenirentur haud facile cuiquam in mentem venisset de iis aliquid suspicari; sed plane quis illa ut impossibilia contempsisset. Solent enim homines de rebus novis ad exemplum veterum, et secundum phantasiam ex iis præceptam et inquinatam, hariolari; quod genus opinandi fallacissimum est, quandoquidem multa ex his quæ ex fontibus rerum petuntur per rivulos consuetos non fluant.

Veluti si quis, ante tormentorum igneorum inventionem, rem per effectus descripsisset, atque in hunc modum dixisset: inventum quoddam detectum esse, per quod muri et munitiones quæque maximæ ex longo intervallo concuti et dejici possint; homines sane de viribus tormentorum et machinarum per pondera et rotas et hujusmodi arietationes et impulsus multiplicandis, multa et varia secum cogitaturi fuissent; de vento autem igneo, tam subito et violenter se expandente et exsufflante, vix unquam aliquid alicujus imaginationi aut phantasiæ occursurum fuisset; utpote cujus exemplum in proximo non vidisset[1], nisi forte in terræ motu aut fulmine, quæ, ut magnalia naturæ et non imitabilia ab homine, homines statim rejecturi fuissent.

Eodem modo si, ante fili bombycini inventionem, quispiam hujusmodi sermonem injecisset: esse quoddam fili genus inventum ad vestium et supellectilis usum, quod filum linteum aut laneum tenuitate et nihilominus tenacitate, ac etiam splendore et mollitie, longe superaret; homines statim aut de serico aliquo vegetabili, aut de animalis alicujus pilis delicatioribus, aut de

[1] As a thing to which he had seen nothing immediately analogous.

avium plumis et lanugine, aliquid opinaturi fuissent; verum de vermis pusilli textura, eaque tam copiosa et se renovante et anniversaria, nil fuissent certe commenturi. Quod si quis etiam de vermi verbum aliquod injecisset, ludibrio certe futurus fuisset, ut qui novas aranearum operas somniaret.

Similiter, si ante inventionem acus nauticæ quispiam hujusmodi sermonem intulisset: inventum esse quoddam instrumentum, per quod cardines et puncta cœli exacte capi et dignosci possint; homines statim de magis exquisita fabricatione instrumentorum astronomicorum, ad multa et varia, per agitationem phantasiæ, discursuri fuissent; quod vero aliquid inveniri possit, cujus motus cum cœlestibus tam bene conveniret, atque ipsum tamen ex cœlestibus non esset, sed tantum substantia lapidea aut metallica, omnino incredibile visum fuisset. Atque hæc tamen et similia per tot mundi ætates homines latuerunt, nec per philosophiam aut artes rationales inventa sunt, sed casu et per occasionem; suntque illius (ut diximus) generis, ut ab iis quæ antea cognita fuerunt plane heterogenea et remotissima sint, ut prænotio aliqua nihil prorsus ad illa conducere potuisset.

Itaque sperandum omnino est, esse adhuc in naturæ sinu multa excellentis usus recondita, quæ nullam cum jam inventis cognationem habent aut parallelismum, sed omnino sita sunt extra vias phantasiæ; quæ tamen adhuc inventa non sunt; quæ proculdubio per multos sæculorum circuitus et ambages et ipsa quandoque prodibunt, sicut illa superiora prodierunt; sed per viam quam nunc tractamus, propere et subito et simul repræsentari[1] et anticipari possunt.

CX.

Attamen conspiciuntur et alia inventa ejus generis quæ fidem faciant, posse genus humanum nobilia inventa, etiam ante pedes posita, præterire et transilire. Utcunque enim pulveris tormentarii vel fili bombycini vel acus nauticæ vel sacchari vel papyri vel similium inventa quibusdam rerum et naturæ proprietatibus niti videantur, at certe Imprimendi artificium nil

[1] *I. e.* to be presented at once, before the regular time. Thus Pliny, 31. 2., "Thespiarum fons conceptus mulieribus *repræsentat*;" *i. e.* makes them conceive at once. And Cicero, Ep. ad Fam. v. 16., "neque debemus expectare temporis medicinam, quam *repræsentare* ratione possimus." And again Phil. 2., "Corpus libenter obtulerim, si *repræsentari* morte meâ libertas civitatis potest;" *i. e.* to be recovered at once; or at least the recovery hastened. Many other examples are given by Facciolati, showing that this was a very common use of the word. —*J. S.*

habet quod non sit apertum et fere obvium. Et nihilominus homines, non advertentes literarum modulos difficilius scilicet collocari quam literæ per motum manus scribantur, sed hoc interesse, quod literarum moduli semel collocati infinitis impressionibus, literæ autem per manum exaratæ unicæ tantum scriptioni, sufficiant; aut fortasse iterum non advertentes atramentum ita inspissari posse, ut tingat, non fluat; præsertim literis resupinatis et impressione facta desuper; hoc pulcherrimo invento (quod ad doctrinarum propagationem tantum facit) per tot sæcula caruerunt.

Solet autem mens humana, in hoc inventionis curriculo, tam læva sæpenumero et male composita esse, ut primo diffidat, et paulo post se contemnat; atque primo incredibile ei videatur aliquid tale inveniri posse, postquam autem inventum sit, incredibile rursus videatur id homines tamdiu fugere potuisse. Atque hoc ipsum ad spem rite trahitur; superesse nimirum adhuc magnum inventorum cumulum, qui non solum ex operationibus incognitis eruendis, sed et ex jam cognitis transferendis et componendis et applicandis, per eam quam diximus Experientiam literatam deduci possit.

CXI.

Neque illud omittendum ad faciendam spem: reputent (si placet) homines infinitas ingenii, temporis, facultatum expensas, quas homines in rebus et studiis longe minoris usus et pretii collocant; quorum pars quota si ad sana et solida verteretur, nulla non difficultas superari possit. Quod idcirco adjungere visum est, quia plane fatemur Historiæ Naturalis et Experimentalis collectionem, qualem animo metimur et qualis esse debet, opus esse magnum, et quasi regium, et multæ operæ atque impensæ.

CXII.

Interim particularium multitudinem nemo reformidet, quin potius hoc ipsum ad spem revocet. Sunt enim artium et naturæ particularia Phænomena manipuli instar ad ingenii commenta, postquam ab evidentia rerum disjuncta et abstracta fuerint. Atque hujus viæ exitus in aperto est, et fere in propinquo; alterius exitus nullus, sed implicatio infinita. Homines enim adhuc parvam in Experientia moram fecerunt, et eam leviter perstrinxerunt, sed in meditationibus et commentationibus ingenii infinitum tempus contriverunt. Apud nos vero si esset

præsto quispiam qui de facto naturæ ad interrogata responderet[1], paucorum annorum esset inventio causarum et scientiarum omnium.

CXIII.

Etiam nonnihil hominibus spei fieri posse putamus ab exemplo nostro proprio; neque jactantiæ causa hoc dicimus sed quod utile dictu sit. Si qui diffidant, me videant, hominem inter homines ætatis meæ civilibus negotiis occupatissimum, nec firma admodum valetudine (quod magnum habet temporis dispendium), atque in hac re plane protopirum, et vestigia nullius sequutum, neque hæc ipsa cum ullo mortalium communicantem, et tamen veram viam constanter ingressum et ingenium rebus submittentem, hæc ipsa aliquatenus (ut existimamus) provexisse; et deinceps videant, quid ab hominibus otio abundantibus, atque a laboribus consociatis, atque a temporum successione, post hæc indicia nostra expectandum sit; præsertim in via quæ non singulis solummodo pervia est (ut fit in via illa rationali), sed ubi hominum labores et operæ (præsertim quantum ad experientiæ collectam) optime distribui et deinde componi possint. Tum enim homines vires suas nosse incipient, cum non eadem infiniti, sed alia alii præstabunt.

CXIV.

Postremo, etiamsi multo infirmior et obscurior aura spei ab ista Nova Continente spiraverit[2], tamen omnino experiendum esse (nisi velimus animi esse plane abjecti) statuimus. Non enim res pari periculo non tentatur, et non succedit; cum in illo ingentis boni, in hoc exiguæ humanæ operæ, jactura vertatur. Verum ex dictis, atque etiam ex non dictis, visum est nobis spei abunde subesse, non tantum homini strenuo ad experiendum, sed etiam prudenti et sobrio ad credendum.

CXV.

Atque de desperatione tollenda, quæ inter causas potentissimas ad progressum scientiarum remorandum et inhibendum fuit, jam dictum est. Atque simul sermo de signis et causis errorum, et inertiæ et ignorantiæ quæ invaluit, absolutus est; præsertim

[1] The allusion is to judicial examinationon interrogatories. Naturæ is to be construed with de facto, and not with interrogata. "Interrogata naturæ" cannot be rendered our "interrogations of nature," which is Mr. Wood's translation.

[2] Bacon refers to what Peter Martyr Aughiera has related, that Columbus observing the west-winds which blow at certain times of the year on the coast of Portugal, came to the conclusion that there must be land to generate them.

cum subtiliores causæ, et quæ in judicium populare aut observationem non incurrunt, ad ea quæ de Idolis animi humani dicta sunt referri debeant.

Atque hic simul pars destruens Instaurationis nostræ claudi debet, quæ perficitur tribus redargutionibus; redargutione nimirum *Humanæ Rationis Nativæ* et sibi permissæ [1]; redargutione *Demonstrationum;* et redargutione *Theoriarum*, sive philosophiarum et doctrinarum quæ receptæ sunt. Redargutio vero earum talis fuit qualis esse potuit; videlicet per signa, et evidentiam causarum; cum confutatio alia nulla a nobis (qui et de principiis et de demonstrationibus ab aliis dissentimus) adhiberi potuerit.

Quocirca tempus est, ut ad ipsam artem et normam Interpretandi Naturam veniamus; et tamen nonnihil restat quod prævertendum est. Quum enim in hoc primo Aphorismorum libro illud nobis propositum sit, ut tam ad intelligendum quam ad recipiendum ea quæ sequuntur mentes hominum præparentur; expurgata jam et abrasa et æquata mentis area, sequitur ut mens sistatur in positione bona, et tanquam aspectu benevolo, ad ea quæ proponemus. Valet enim in re nova ad præjudicium, non solum præoccupatio fortis opinionis veteris, sed et præceptio sive præfiguratio falsa rei quæ affertur. Itaque conabimur efficere ut habeantur bonæ et veræ de iis quæ adducimus opiniones, licet ad tempus tantummodo, et tanquam usurariæ [2], donec res ipsa pernoscatur.

CXVI.

Primo itaque postulandum videtur, ne existiment homines nos, more antiquorum Græcorum, aut quorundam novorum hominum, Telesii, Patricii, Severini [3], sectam aliquam in philosophia condere velle. Neque enim hoc agimus; neque etiam multum interesse putamus ad hominum fortunas quales quis

[1] For an explanation of this passage, as connected with the first form of the doctrine of Idols when they were divided into *three* kinds to each of which one of these confutations corresponded, see the preface. In comparing it with the corresponding passages in the *Partis secundæ delineatio*, and the *Distributio operis*, it will be observed that the order of the confutations is inverted. The first of these redargutions extends from the 40th to the 60th aphorism; the other two, which are not kept distinct, end here. — *J. S.*

[2] Compare Distr. Op., p. 143.: "Ac quinta pars ad tempus tantum, donec reliqua perficiantur, adhibetur; et tanquam fœnus redditur usque dum sors haberi possit." See also the next aphorism, in which the same expression occurs.

[3] See *De Aug.* iv. 3. for a rather fuller mention of these philosophers, and the note upon the passage. See also, for Telesius, the preface to *Fabula Cœli et Cupidinis;* for Patricius, the *Descriptio Globi intellectualis;* for Severinus, the *Temporis Partus Masculus.* — *J. S.*

opiniones abstractas de natura et rerum principiis habeat; neque dubium est, quin multa hujusmodi et vetera revocari et nova introduci possint; quemadmodum et complura themata cœli supponi possunt, quæ cum phænomenis sat bene conveniunt, inter se tamen dissentiunt.

At nos de hujusmodi rebus opinabilibus, et simul inutilibus, non laboramus. At contra nobis constitutum est experiri, an revera potentiæ et amplitudinis humanæ firmiora fundamenta jacere ac fines in latius proferre possimus. Atque licet sparsim et in aliquibus subjectis specialibus, longe veriora habeamus et certiora (ut arbitramur) atque etiam magis fructuosa quam quibus homines adhuc utuntur, (quæ in quintam Instaurationis nostræ partem congessimus,) tamen theoriam nullam universalem aut integram proponimus. Neque enim huic rei tempus adhuc adesse videtur. Quin nec spem habemus vitæ producendæ ad sextam Instaurationis partem (quæ philosophiæ per legitimam Naturæ Interpretationem inventæ destinata est) absolvendam; sed satis habemus si in mediis sobrie et utiliter nos geramus, atque interim semina veritatis sincerioris in posteros spargamus, atque initiis rerum magnarum non desimus.

CXVII.

Atque quemadmodum sectæ conditores non sumus, ita nec operum particularium largitores aut promissores. Attamen possit aliquis hoc modo occurrere; quod nos, qui tam sæpe operum mentionem faciamus et omnia eo trahamus, etiam operum aliquorum pignora exhibeamus. Verum via nostra et ratio (ut sæpe perspicue diximus et adhuc dicere juvat) ea est; ut non opera ex operibus sive experimenta ex experimentis (ut empirici), sed ex operibus et experimentis causas et axiomata, atque ex causis et axiomatibus rursus nova opera et experimenta (ut legitimi Naturæ Interpretes), extrahamus.

Atque licet in tabulis nostris inveniendi (ex quibus quarta pars Instaurationis consistit), atque etiam exemplis particularium (quæ in secunda parte adduximus), atque insuper in observationibus nostris super historiam (quæ in tertia parte operis descripta est), quivis vel mediocris perspicaciæ et solertiæ complurium operum nobilium indicationes et designationes ubique notabit; ingenue tamen fatemur, historiam naturalem quam adhuc habemus, aut ex libris aut ex inquisitione propria, non tam copiosam esse et verificatam, ut legitimæ Interpretationi satisfacere aut ministrare possit.

Itaque si quis ad mechanica sit magis aptus et paratus, atque sagax ad venanda opera[1] ex conversatione sola cum experimentis, ei permittimus et relinquimus illam industriam, ut ex historia nostra et tabulis multa tanquam in via decerpat et applicet ad opera, ac veluti fœnus recipiat ad tempus, donec sors haberi possit. Nos vero, cum ad majora contendamus, moram omnem præproperam et præmaturam in istiusmodi rebus tanquam Atalantæ pilas (ut sæpius solemus dicere) damnamus. Neque enim aurea poma pueriliter affectamus, sed omnia in victoria cursus artis super naturam ponimus; neque muscum aut segetem herbidam demetere festinamus, sed messem tempestivam expectamus.

CXVIII.

Occurret etiam alicui proculdubio, postquam ipsam historiam nostram et inventionis tabulas perlegerit, aliquid in ipsis experimentis minus certum, vel omnino falsum; atque propterea secum fortasse reputabit, fundamentis et principiis falsis et dubiis inventa nostra niti. Verum hoc nihil est; necesse enim est talia sub initiis evenire. Simile enim est ac si in scriptione aut impressione una forte litera aut altera perperam posita aut collocata sit; id enim legentem non multum impedire solet, quandoquidem errata ab ipso sensu facile corriguntur. Ita etiam cogitent homines multa in historia naturali experimenta falso credi et recipi posse, quæ paulo post a causis et axiomatibus inventis facile expunguntur et rejiciuntur. Sed tamen verum est, si in historia naturali et experimentis magna et crebra et continua fuerint errata, illa nulla ingenii aut artis fœlicitate corrigi aut emendari posse. Itaque si in historia nostra naturali, quæ tanta diligentia et severitate et fere religione probata et collecta est, aliquid in particularibus quandoque subsit falsitatis aut erroris, quid tandem de naturali historia vulgari, quæ præ nostra tam negligens est et facilis, dicendum erit? aut de philosophia et scientiis super hujusmodi arenas (vel syrtes potius) ædificatis? Itaque hoc quod diximus neminem moveat.

CXIX.

Occurrent etiam in historia nostra et experimentis plurimæ res, primo leves et vulgatæ, deinde viles et illiberales, postremo

[1] Compare *Temporis Partus Masculus* : — " Siquidem utile genus eorum est qui de theoriis non admodum soliciti, mechanicâ quadam subtilitate rerum inventarum extensiones prehendunt; qualis est Bacon."—*J. S.*

nimis subtiles ac mere speculativæ, et quasi nullius usus: quod genus rerum, hominum studia avertere et alienare possit.

Atque de istis rebus quæ videntur vulgatæ, illud homines cogitent; solere sane eos adhuc nihil aliud agere, quam ut eorum quæ rara sunt causas ad ea quæ frequenter fiunt referant et accommodent, at ipsorum quæ frequenter eveniunt nullas causas inquirant, sed ea ipsa recipiant tanquam concessa et admissa.

Itaque non ponderis, non rotationis cœlestium, non caloris, non frigoris, non luminis, non duri, non mollis, non tenuis, non densi, non liquidi, non consistentis, non animati, non inanimati, non similaris, non dissimilaris, nec demum organici, causas quærunt; sed illis, tanquam pro evidentibus et manifestis, receptis, de ceteris rebus quæ non tam frequenter et familiariter occurrunt disputant et judicant.

Nos vero, qui satis scimus nullum de rebus raris aut notabilibus judicium fieri posse, multo minus res novas in lucem protrahi, absque vulgarium rerum causis et causarum causis rite examinatis et repertis, necessario ad res vulgarissimas in historiam nostram recipiendas compellimur. Quinetiam nil magis philosophiæ offecisse deprehendimus quam quod res quæ familiares sunt et frequenter occurrunt contemplationem hominum non morentur et detineant, sed recipiantur obiter, neque earum causæ quæri soleant: ut non sæpius requiratur informatio de rebus ignotis, quam attentio in notis.

CXX.

Quod vero ad rerum vilitatem attinet, vel etiam turpitudinem, quibus (ut ait Plinius) honos præfandus est[1]; eæ res, non minus quam lautissimæ et pretiosissimæ, in historiam naturalem recipiendæ sunt. Neque propterea polluitur naturalis historia: sol enim æque palatia et cloacas ingreditur, neque tamen polluitur. Nos autem non Capitolium aliquod aut Pyramidem hominum superbiæ dedicamus aut condimus, sed templum sanctum ad exemplar mundi in intellectu humano fundamus. Itaque exemplar sequimur. Nam quicquid essentia dignum est, id etiam scientia dignum, quæ est essentiæ imago. At vilia æque subsistunt ac lauta. Quinetiam, ut e quibusdam putridis materiis, veluti musco et zibetho, aliquando optimi odores

[1] "Rerum natura, hoc est, vita narratur, et hæc sordidissimâ sui parte, ut plurimarum rerum aut rusticis vocabulis aut externis, imo barbaris, etiam cum honoris præfatione ponendis."—Plin. *Hist. Nat.* i. ad init. Compare also Aristot. *De Part. Animal.* i. 5.

generantur; ita et ab instantiis vilibus et sordidis quandoque eximia lux et informatio emanat. Verum de hoc nimis multa; cum hoc genus fastidii sit plane puerile et effœminatum.

CXXI.

At de illo omnino magis accurate dispiciendum; quod plurima in historia nostra captui vulgari, aut etiam cuivis intellectui (rebus præsentibus assuefacto), videbuntur curiosæ cujusdam et inutilis subtilitatis. Itaque de hoc ante omnia et dictum et dicendum est; hoc scilicet; nos jam sub initiis et ad tempus, tantum *lucifera* experimenta, non *fructifera* quærere; ad exemplum creationis divinæ, quod sæpius diximus, quæ primo die lucem tantum produxit, eique soli unum integrum diem attribuit, neque illo die quicquam materiati operis immiscuit.

Itaque si quis istiusmodi res nullius esse usus putet, idem cogitat ac si nullum etiam lucis esse usum censeat, quia res scilicet solida aut materiata non sit. Atque revera dicendum est, simplicium naturarum cognitionem bene examinatam et definitam instar lucis esse; quæ ad universa operum penetralia aditum præbet, atque tota agmina operum et turmas, et axiomatum nobilissimorum fontes, potestate quadam complectitur et post se trahit; in se tamen non ita magni usus est. Quin et literarum elementa per se et separatim nihil significant nec alicujus usus sunt, sed tamen ad omnis sermonis compositionem et apparatum instar materiæ primæ sunt. Etiam semina rerum potestate valida, usu (nisi in processu suo) nihili sunt. Atque lucis ipsius radii dispersi, nisi coeant, beneficium suum non impertiuntur.

Quod si quis subtilitatibus speculativis offendatur, quid de scholasticis viris dicendum erit, qui subtilitatibus immensum indulserunt? quæ tamen subtilitates in verbis, aut saltem vulgaribus notionibus (quod tantundem valet), non in rebus aut natura consumptæ fuerunt, atque utilitatis expertes erant, non tantum in origine, sed etiam in consequentiis; tales autem non fuerunt, ut haberent in præsens utilitatem nullam, sed per consequens infinitam; quales sunt eæ de quibus loquimur. Hoc vero sciant homines pro certo, omnem subtilitatem disputationum et discursuum mentis, si adhibeatur tantum post axiomata inventa, seram esse et præposteram; et subtilitatis tempus verum ac proprium, aut saltem præcipuum, versari in pensitanda experientia et inde constituendis axiomatibus; nam illa altera subtilitas naturam prensat et captat, sed nunquam apprehendit

aut capit. Et verissimum certe est quod de occasione sive fortuna dici solet, si transferatur ad naturam: videlicet, *eam a fronte comatam, ab occipitio calvam esse.*

Denique de contemptu in naturali historia rerum aut vulgarium, aut vilium, aut nimis subtilium et in originibus suis inutilium, illa vox mulierculæ ad tumidum principem, qui petitionem ejus ut rem indignam et majestate sua inferiorem abjecisset, pro oraculo sit; *Desine ergo rex esse:* quia certissimum est, imperium in naturam, si quis hujusmodi rebus ut nimis exilibus et minutis vacare nolit, nec obtineri nec geri posse.

CXXII.

Occurrit[1] etiam et illud; mirabile quiddam esse et durum, quod nos omnes scientias atque omnes authores simul ac veluti uno ictu et impetu summoveamus: idque non assumpto aliquo ex antiquis in auxilium et præsidium nostrum, sed quasi viribus propriis.

Nos autem scimus, si minus sincera fide agere voluissemus, non difficile fuisse nobis, ista quæ afferuntur vel ad antiqua sæcula ante Græcorum tempora (cum scientiæ de natura magis fortasse sed tamen majore cum silentio floruerint, neque in Græcorum tubas et fistulas adhuc incidissent), vel etiam (per partes certe) ad aliquos ex Græcis ipsis referre, atque astipulationem et honorem inde petere: more novorum hominum, qui nobilitatem sibi ex antiqua aliqua prosapia, per genealogiarum favores, astruunt et affingunt. Nos vero rerum evidentia freti, omnem commenti et imposturæ conditionem rejicimus; neque ad id quod agitur plus interesse putamus, utrum quæ jam inveniantur antiquis olim cognita, et per rerum vicissitudines et sæcula occidentia et orientia sint, quam hominibus curæ esse debere, utrum Novus Orbis fuerit insula illa Atlantis et veteri mundo cognita, an nunc primum reperta. Rerum enim inventio a naturæ luce petenda, non ab antiquitatis tenebris repetenda est.

Quod vero ad universalem istam reprehensionem attinet, certissimum est vere rem reputanti, eam et magis probabilem esse et magis modestam, quam si facta fuisset ex parte. Si enim in primis notionibus errores radicati non fuissent, fieri non potuisset quin nonnulla recte inventa alia perperam inventa correxissent. Sed cum errores fundamentales fuerint, atque ejusmodi ut homines potius res neglexerint ac præterierint,

[1] So in the original edition. I think it should be *occurret.*—*J. S.*

quam de illis pravum aut falsum judicium fecerint; minime mirum est, si homines id non obtinuerint quod non egerint, nec ad metam pervenerint quam non posuerint aut collocarint, neque viam emensi sint quam non ingressi sint aut tenuerint.

Atque insolentiam rei quod attinet; certe si quis manus constantia atque oculi vigore lineam magis rectam aut circulum magis perfectum se describere posse quam alium quempiam sibi assumat, inducitur scilicet facultatis comparatio: quod si quis asserat se adhibita regula aut circumducto circino lineam magis rectam aut circulum magis perfectum posse describere, quam aliquem alium vi sola oculi et manus, is certe non admodum jactator fuerit. Quin hoc quod dicimus non solum in hoc nostro conatu primo et incœptivo locum habet; sed etiam pertinet ad eos qui huic rei posthac incumbent. Nostra enim via inveniendi scientias exæquat fere ingenia, et non multum excellentiæ eorum relinquit: cum omnia per certissimas regulas et demonstrationes transigat. Itaque hæc nostra (ut sæpe diximus) fœlicitatis cujusdam sunt potius quam facultatis, et potius temporis partus quam ingenii. Est enim certe casus aliquis non minus in cogitationibus humanis, quam in operibus et factis.

CXXIII.

Itaque dicendum de nobis ipsis quod ille per jocum dixit, præsertim cum tam bene rem secet: *fieri non potest ut idem sentiant, qui aquam et qui vinum bibant.* At cæteri homines, tam veteres quam novi, liquorem biberunt crudum in scientiis, tanquam aquam vel sponte ex intellectu manantem, vel per dialecticam, tanquam per rotas ex puteo, haustam. At nos liquorem bibimus et propinamus ex infinitis confectam uvis, iisque maturis et tempestivis, et per racemos quosdam collectis ac decerptis, et subinde in torculari pressis, ac postremo in vase repurgatis et clarificatis. Itaque nil mirum si nobis cum aliis non conveniat.

CXXIV.

Occurret proculdubio et illud: nec metam aut scopum scientiarum a nobis ipsis (id quod in aliis reprehendimus) verum et optimum præfixum esse. Esse enim contemplationem veritatis omni operum utilitate et magnitudine digniorem et celsiorem: longam vero istam et sollicitam moram in experientia et materia et rerum particularium fluctibus, mentem veluti humo affigere, vel potius in Tartarum quoddam confusionis et perturbationis dejicere; atque ab abstractæ sapientiæ serenitate et tranquillitate

(tanquam a statu multo diviniore) arcere et summovere. Nos vero huic rationi libenter assentimur; et hoc ipsum, quod innuunt ac præoptant, præcipue atque ante omnia agimus. Etenim verum exemplar mundi in intellectu humano fundamus; quale invenitur, non quale cuipiam sua propria ratio dictaverit. Hoc autem perfici non potest, nisi facta mundi dissectione atque anatomia diligentissima. Modulos vero ineptos mundorum et tanquam simiolas, quas in philosophiis phantasiæ hominum extruxerunt, omnino dissipandas edicimus. Sciant itaque homines (id quod superius diximus) quantum intersit inter humanæ mentis Idola, et divinæ mentis Ideas. Illa enim nihil aliud sunt quam abstractiones ad placitum: hæ autem sunt vera signacula Creatoris super creaturas, prout in materia per lineas veras et exquisitas imprimuntur et terminantur. Itaque ipsissimæ res sunt (in hoc genere) veritas et utilitas[1]: atque opera ipsa pluris facienda sunt, quatenus sunt veritatis pignora, quam propter vitæ commoda.

CXXV.

Occurret fortasse et illud: nos tanquam actum agere, atque antiquos ipsos eandem quam nos viam tenuisse. Itaque verisimile putabit quispiam etiam nos, post tantum motum et molitionem, deventuros tandem ad aliquam ex illis philosophiis quæ apud antiquos valuerunt. Nam et illos in meditationum suarum principiis vim et copiam magnam exemplorum et particularium paravisse, atque in commentarios per locos et titulos digessisse, atque inde philosophias suas et artes confecisse, et postea, re comperta, pronuntiasse, et exempla ad fidem et

[1] Compare *Partis Instaurationis Secundæ Delineatio:* — "Quinetiam illis quibus in contemplationis amorem effusis frequens apud nos operum mentio asperum quiddam et ingratum et mechanicum sonat, monstrabimus quantum illi desideriis suis propriis adversentur, cum *puritas contemplationum* atque *substructio et inventio operum* prorsus *eisdem rebus nitantur* et simul perfruantur." In a corresponding passage in the *Cogitata et Visa* we find, instead of the last clause, "etenim in naturâ Opera non tantum vitæ beneficia sed et veritatis pignora esse. . . Veritatem enim per Operum indicationem magis quam ex argumentatione aut etiam ex sensu et patefieri et probari. Quare *unam eandemque rationem et conditionis humanæ et mentis dotandæ* esse."

Compare also *Nov. Org.* ii. 4.: "Ista autem duo pronuntiata, Activum et Contemplativum, *res eadem sunt;* et quod in operando utilissimum vel in sciendo verissimum."

I do not think that the use of *ipsissimæ* here can be justified: if the meaning be (as I think it must) that truth and utility are (in this kind) "the very same things." If *ipsissimæ* be used correctly, the meaning must be that things themselves, the very facts of nature, *are* truth and utility both. But in that case we should expect "*et* veritas et utilitas." Mr. Ellis proposes to render the phrase thus: "Truth and utility are in this kind the very things we seek for." But to me it seems less probable that Bacon would have expressed such a meaning by such a phrase than that he used the word *ipsissimæ* incorrectly in the sense I have attributed to it. —*J. S.*

docendi lumen sparsim addidisse; sed particularium notas et codicillos ac commentarios suos in lucem edere supervacuum et molestum putasse; ideoque fecisse quod in ædificando fieri solet, nempe post ædificii structuram machinas et scalas a conspectu amovisse. Neque aliter factum esse credere certe oportet. Verum nisi quis omnino oblitus fuerit eorum quæ superius dicta sunt, huic objectioni (aut scrupulo potius) facile respondebit. Formam enim inquirendi et inveniendi apud antiquos et ipsi profitentur[1], et scripta eorum præ se ferunt. Ea autem non alia fuit, quam ut ab exemplis quibusdam et particularibus (additis notionibus communibus, et fortasse portione nonnulla ex opinionibus receptis quæ maxime placuerunt) ad conclusiones maxime generales sive principia scientiarum advolarent, ad quorum veritatem immotam et fixam conclusiones inferiores per media educerent ac probarent; ex quibus artem constituebant. Tum demum si nova particularia et exempla mota essent et adducta quæ placitis suis refragarentur, illa aut per distinctiones aut per regularum suarum explanationes in ordinem subtiliter redigebant, aut demum per exceptiones grosso modo summovebant: at rerum particularium non refragantium causas ad illa principia sua laboriose et pertinaciter accommodabant. Verum nec historia naturalis et experientia illa erat, quam fuisse oportebat, (longe certe abest,) et ista advolatio ad generalissima omnia perdidit.

CXXVI.

Occurret et illud: nos, propter inhibitionem quandam pronuntiandi et principia certa ponendi donec per medios gradus ad generalissima rite perventum sit, suspensionem quandam judicii tueri, atque ad Acatalepsiam rem deducere. Nos vero non *Acatalepsiam*, sed *Eucatalepsiam* meditamur et proponimus: sensui enim non derogamus, sed ministramus; et intellectum non contemnimus, sed regimus. Atque melius est scire quantum opus sit, et tamen nos non penitus scire putare, quam penitus scire nos putare, et tamen nil eorum quæ opus est scire.

CXXVII.

Etiam dubitabit quispiam, potius quam objiciet, utrum nos de Naturali tantum Philosophia, an etiam de scientiis reliquis, Logicis, Ethicis, Politicis, secundum viam nostram perficiendis

[1] "Profitemur" in the original edition; obviously a misprint. Compare the corresponding passage in *Inquisitio legitima de Motu*.

loquamur. At nos certe de universis hæc quæ dicta sunt intelligimus: atque quemadmodum vulgaris logica, quæ regit res per Syllogismum, non tantum ad naturales, sed ad omnes scientias pertinet; ita et nostra, quæ procedit per Inductionem, omnia complectitur. Tam enim historiam et tabulas inveniendi conficimus de Ira, Metu, et Verecundia, et similibus; ac etiam de exemplis rerum Civilium: nec minus de motibus mentalibus Memoriæ, Compositionis et Divisionis[1], Judicii, et reliquorum: quam de Calido et Frigido, aut Luce, aut Vegetatione, aut similibus.[2] Sed tamen cum nostra ratio Interpretandi, post historiam præparatam et ordinatam, non mentis tantum motus et discursus (ut logica vulgaris), sed et rerum naturam intueatur; ita mentem regimus, ut ad rerum naturam se, aptis per omnia modis, applicare possit. Atque propterea multa et diversa in doctrina Interpretationis præcipimus, quæ ad subjecti de quo inquirimus qualitatem et conditionem, modum inveniendi nonnulla ex parte applicent.

CXXVIII.

At illud de nobis ne dubitare quidem fas sit; utrum nos philosophiam et artes et scientias quibus utimur destruere et demoliri cupiamus: contra enim, earum et usum et cultum et honores libenter amplectimur. Neque enim ullo modo officimus, quin istæ quæ invaluerunt et disputationes alant, et sermones ornent, et ad professoria munera ac vitæ civilis compendia adhibeantur et valeant; denique, tanquam numismata quædam, consensu inter homines recipiantur. Quinetiam significamus aperte, ea quæ nos adducimus ad istas res non multum idonea futura; cum ad vulgi captum deduci omnino non possint, nisi per effecta et opera tantum. At hoc ipsum quod de affectu nostro et bona voluntate erga scientias receptas dicimus quam vere profiteamur, scripta nostra in publicum edita (præsertim libri de Progressu Scientiarum) fidem faciant. Itaque id verbis amplius vincere non conabimur. Illud interim constanter et diserte monemus; his modis qui in usu sunt nec magnos in scientiarum doctrinis et contemplatione progressus fieri, nec illas ad amplitudinem operum deduci posse.

[1] Synthesis and analysis?

[2] This passage is important because it shows that Bacon proposed to apply his method to mental phenomena; which is in itself a sufficient refutation of M. Cousin's interpretation of the passage in which, when censuring the writings of the schoolmen, he compares them to the self-evolved web of the spider. I have elsewhere spoken more at length of this passage. [See p. 92.]

CXXIX.

Superest ut de Finis excellentia pauca dicamus. Ea si prius dicta fuissent, votis similia videri potuissent: sed spe jam facta, et iniquis præjudiciis sublatis, plus fortasse ponderis habebunt. Quod si nos omnia perfecissemus et plane absolvissemus, nec alios in partem et consortium laborum subinde vocaremus, etiam ab hujusmodi verbis abstinuissemus, ne acciperentur in prædicationem meriti nostri. Cum vero aliorum industria acuenda sit et animi excitandi atque accendendi, consentaneum est ut quædam hominibus in mentem redigamus.

Primo itaque videtur inventorum nobilium introductio inter actiones humanas longe primas partes tenere: id quod antiqua sæcula judicaverunt. Ea enim rerum inventoribus divinos honores tribuerunt; iis autem qui in rebus civilibus merebantur (quales erant urbium et imperiorum conditores, legislatores, patriarum a diuturnis malis liberatores, tyrannidum debellatores, et his similes), heroum tantum honores decreverunt. Atque certe si quis ea recte conferat, justum hoc prisci sæculi judicium reperiet. Etenim inventorum beneficia ad universum genus humanum pertinere possunt, civilia ad certas tantummodo hominum sedes: hæc etiam non ultra paucas ætates durant, illa quasi perpetuis temporibus. Atque status emendatio in civilibus non sine vi et perturbatione plerumque procedit: at inventa beant, et beneficium deferunt absque alicujus injuria aut tristitia.

Etiam inventa quasi novæ creationes sunt, et divinorum operum imitamenta; ut bene cecinit ille:

> "Primum frugiferos fœtus mortalibus ægris
> Dididerant quondam præstanti nomine Athenæ;
> Et RECREAVERUNT vitam, legesque rogarunt."[1]

Atque videtur notatu dignum in Solomone; quod cum imperio, auro, magnificentia operum, satellitio, famulitio, classe insuper, et nominis claritate, ac summa hominum admiratione floreret, tamen nihil horum delegerit sibi ad gloriam, sed ita pronuntiaverit: *Gloriam Dei esse, celare rem; gloriam regis, investigare rem.*[2]

Rursus (si placet) reputet quispiam, quantum intersit inter hominum vitam in excultissima quapiam Europæ provincia, et in regione aliqua Novæ Indiæ maxime fera et barbara: ea[3]

[1] Lucretius, vi. 1—3. [2] Prov. xxv. 2. [3] So in the original edition.

tantum differre existimabit, ut merito *hominem homini Deum esse*, non solum propter auxilium et beneficium, sed etiam per status comparationem, recte dici possit. Atque hoc non solum, non cœlum, non corpora, sed artes præstant.

Rursus, vim et virtutem et consequentias rerum inventarum notare juvat: quæ non in aliis manifestius occurrunt, quam in illis tribus quæ antiquis incognitæ, et quarum primordia, licet recentia, obscura et ingloria sunt: Artis nimirum Imprimendi, Pulveris Tormentarii, et Acus Nauticæ. Hæc enim tria rerum faciem et statum in orbe terrarum mutaverunt: primum, in re literaria; secundum, in re bellica; tertium, in navigationibus: unde innumeræ rerum mutationes sequutæ sunt; ut non imperium aliquod, non secta, non stella, majorem efficaciam et quasi influxum super res humanas exercuisse videatur, quam ista mechanica exercuerunt.

Præterea non abs re fuerit, tria hominum ambitionis genera et quasi gradus distinguere. Primum eorum, qui propriam potentiam in patria sua amplificare cupiunt; quod genus vulgare est et degener. Secundum eorum, qui patriæ potentiam et imperium inter humanum genus amplificare nituntur; illud plus certe habet dignitatis, cupiditatis haud minus. Quod si quis humani generis ipsius potentiam et imperium in rerum universitatem instaurare et amplificare conetur, ea proculdubio ambitio (si modo ita vocanda sit) reliquis et sanior est et augustior. Hominis autem imperium in res, in solis artibus et scientiis ponitur. Naturæ enim non imperatur, nisi parendo.

Præterea, si unius alicujus particularis inventi utilitas ita homines affecerit, ut eum qui genus humanum universum beneficio aliquo devincire potuerit homine majorem putaverint; quanto celsius videbitur tale aliquid invenire, per quod alia omnia expedite inveniri possint? Et tamen (ut verum omnino dicamus) quemadmodum luci magnam habemus gratiam, quod per eam vias inire, artes exercere, legere, nos invicem dignoscere possimus; et nihilominus ipsa visio lucis res præstantior est et pulchrior, quam multiplex ejus usus: ita certe ipsa contemplatio rerum prout sunt, sine superstitione aut impostura, errore aut confusione, in seipsa magis digna est, quam universus inventorum fructus.[1]

Postremo siquis depravationem scientiarum et artium ad ma-

[1] This is one of the passages which show how far Bacon was from what is now called a utilitarian.

litiam et luxuriam et similia objecerit; id neminem moveat. Illud enim de omnibus mundanis bonis dici potest, ingenio, fortitudine, viribus, forma, divitiis, luce ipsa, et reliquis. Recuperet modo genus humanum jus suum in naturam quod ei ex dotatione divina competit, et detur ei copia: usum vero recta ratio et sana religio gubernabit.

CXXX.

Jam vero tempus est ut artem ipsam Interpretandi Naturam proponamus: in qua licet nos utilissima et verissima præcepisse arbitremur, tamen necessitatem ei absolutam (ac si absque ea nil agi possit) aut etiam perfectionem non attribuimus. Etenim in ea opinione sumus; si justam Naturæ et Experientiæ Historiam præsto haberent homines, atque in ea sedulo versarentur, sibique duas res imperare possent; unam, ut receptas opiniones et notiones deponerent; alteram, ut mentem a generalissimis et proximis ab illis ad tempus cohiberent; fore ut etiam vi propria et genuina mentis, absque alia arte, in formam nostram Interpretandi incidere possent. Est enim Interpretatio verum et naturale opus mentis, demptis iis quæ obstant[1]: sed tamen omnia certe per nostra præcepta erunt magis in procinctu, et multo firmiora.

Neque tamen illis nihil addi posse affirmamus: sed contra, nos, qui mentem respicimus non tantum in facultate propria, sed quatenus copulatur cum rebus, Artem inveniendi cum Inventis adolescere posse, statuere debemus.

[1] Compare *Valerius Terminus*, ch. 22.:—"That it is true that interpretation is the very natural and direct intention, action, and progression of the understanding, delivered from impediments; and that all anticipation is but a deflexion or declination by accident." Also *Adv. of Learn.* (2d book):—"For he that shall attentively observe how the mind doth gather this excellent dew of knowledge, like unto that which the poet speaketh of, *Aërii mellis cœlestia dona*, distilling and contriving it out of particulars natural and artificial, as the flowers of the field and garden, shall find that the mind of herself by nature doth manage and act an induction much better than they describe it."—*J. S.*

LIBER SECUNDUS

APHORISMORUM.

LIBER SECUNDUS

APHORISMORUM

DE

INTERPRETATIONE NATURÆ

SIVE DE

REGNO HOMINIS.

APHORISMUS

I.

SUPER datum corpus novam naturam sive novas naturas generare et superinducere, opus et intentio est humanæ Potentiæ. Datæ autem naturæ Formam, sive differentiam veram, sive naturam naturantem [1], sive fontem emanationis (ista enim vocabula habemus quæ ad indicationem rei proxime accedunt) invenire, opus et intentio est humanæ Scientiæ.[2] Atque his operibus primariis subordinantur alia opera duo secundaria et inferioris notæ; priori, transformatio corporum concretorum de alio in aliud, intra terminos Possibilis [3]; posteriori, inventio in omni generatione et motu *latentis processus*, continuati ab

[1] This is the only passage in which I have met with the phrase *natura naturans* used as it is here. With the later schoolmen, as with Spinoza, it denotes God considered as the causa immanens of the universe, and therefore, according to the latter at least, not hypostatically distinct from it. (On the Pantheistic tendency occasionally perceptible among the schoolmen, see Neander's Essay on Scotus Erigena in the *Berlin Memoirs*.) Bacon applies it to the Form, considered as the causa immanens of the properties of the body. I regret not having been able to trace the history of this remarkable phrase. It does not occur, I think, in St. Thomas Aquinas, though I have met with it in an index to his *Summa;* the passage referred to containing a quotation from St. Augustine, in which the latter speaks of "ea natura quæ creavit omnes cæteras instituitque naturas." (*V.* St. Aug., *De Trin.* xiv. 9.) Neither does it occur, so far as I am aware, where we might have expected it, in the *De Divisione Naturæ* of Scotus Erigena. Vossius, *De Vitiis Latini Sermonis*, notices its use among the schoolmen, but gives no particular reference.

[2] See General Preface, § 7. p. 25.

[3] The *possibility* of transmutation, long and strenuously denied, though certainly on no sufficient grounds, is now generally admitted. "There was a time when this fundamental doctrine of the alchemists was opposed to known analogies. It is now no longer so opposed to them, only some stages beyond their present development."—*Faraday, Lectures on Non-Metallic Elements*, p. 106.

Efficiente manifesto et materia manifesta usque ad Formam inditam; et inventio similiter *latentis schematismi* corporum quiescentium et non in motu.[1]

II.

Quam infœliciter se habeat scientia humana quæ in usu est, etiam ex illis liquet quæ vulgo asseruntur. Recte ponitur; *Vere scire, esse per Causas scire.* Etiam non male constituuntur causæ quatuor; Materia, Forma, Efficiens, et Finis. At ex his, Causa Finalis tantum abest ut prosit, ut etiam scientias corrumpat, nisi in hominis actionibus; Formæ inventio habetur pro desperata; Efficiens vero et Materia (quales quæruntur et recipiuntur, remotæ scilicet, absque *latenti processu* ad Formam) res perfunctoriæ sunt et superficiales, et nihili fere ad scientiam veram et activam. Neque tamen obliti sumus nos superius notasse et correxisse errorem mentis humanæ, in deferendo Formis primas essentiæ.[2] Licet enim in natura nihil vere existat præter corpora individua edentia actus puros individuos ex lege; in doctrinis tamen, illa ipsa lex, ejusque inquisitio et inventio atque explicatio, pro fundamento est tam ad sciendum quam ad operandum. Eam autem legem, ejusque paragraphos, Formarum nomine intelligimus[3]; præsertim cum hoc vocabulum invaluerit et familiariter occurrat.

III.

Qui causam alicujus naturæ (veluti albedinis aut caloris) in certis tantum subjectis novit, ejus Scientia imperfecta est; et qui effectum super certas tantum materias (inter eas quæ sunt susceptibiles) inducere potest, ejus Potentia pariter imperfecta est. At qui Efficientem et Materialem causam tantummodo novit (quæ causæ fluxæ sunt, et nihil aliud quam vehicula et causæ Formam deferentes in aliquibus)[4], is ad nova inventa,

[1] In this aphorism Bacon combines the antithesis of corpus and natura, the concrete and the abstract, with the antithesis of power and science, and thus arrives at a quadripartite classification. To translate, as Mr. Craik has done, "natura" by "natural substance" involves the whole subject in confusion.

In the last sentence *continuati* may be translated "continuously carried on." The word is often thus used; as in the dictum "mutatio nil aliud est quam successiva et continuata formæ adquisitio."

[2] [I. § 51. "Formæ enim commenta animi humani sunt, nisi libeat leges illas actûs Formas appellare."] Translate,—"We have noted and corrected as an error of the human mind the opinion that forms give existence." Bacon alludes to the maxim "forma dat esse."

[3] See General Preface, p. 31. The paragraphs of a law are its sections or clauses. It is difficult to attach any definite meaning to Mr. Wood's translation of paragraphos, "its parallels in each science."

[4] *i. e.* "which are unstable causes, and merely vehicles and causes which convey the form in certain cases."

in materia aliquatenus simili et præparata, pervenire potest, sed rerum terminos altius fixos non movet. At qui Formas novit, is naturæ unitatem in materiis dissimillimis complectitur. Itaque quæ adhuc facta non sunt, qualia nec naturæ vicissitudines neque experimentales industriæ neque casus ipse in actum unquam perduxissent, neque cogitationem humanam subitura fuissent, detegere et producere potest. Quare ex Formarum inventione sequitur Contemplatio vera et Operatio libera.

IV.

Licet viæ ad potentiam atque ad scientiam humanam conjunctissimæ sint et fere eædem, tamen propter perniciosam et inveteratam consuetudinem versandi in abstractis, tutius omnino est ordiri et excitare scientias ab iis fundamentis quæ in ordine sunt ad partem activam, atque ut illa ipsa partem contemplativam signet et determinet. Videndum itaque est, ad aliquam naturam super corpus datum generandam et superinducendam, quale quis præceptum aut qualem quis directionem aut deductionem maxime optaret; idque sermone simplici et minime abstruso.

Exempli gratia; si quis argento cupiat superinducere flavum colorem auri aut augmentum ponderis (servatis legibus materiæ [1]), aut lapidi alicui non diaphano diaphaneitatem, aut vitro tenacitatem, aut corpori alicui non vegetabili vegetationem; videndum (inquam) est, quale quis præceptum aut deductionem potissimum sibi dari exoptet. Atque primo, exoptabit aliquis proculdubio sibi monstrari aliquid hujusmodi, quod opere non frustret neque experimento fallat. Secundo, exoptabit quis aliquid sibi præscribi, quod ipsum non astringat et coerceat ad media quædam et modos quosdam operandi particulares. Fortasse enim destituetur, nec habebit facultatem et commoditatem talia media comparandi et procurandi. Quod si sint et alia media et alii modi (præter illud præceptum) progignendæ talis naturæ, ea fortasse ex iis erunt quæ sunt in operantis potestate; a quibus nihilominus per angustias præcepti excludetur, nec fructum capiet. Tertio, optabit aliquid sibi monstrari, quod non sit æque difficile ac illa ipsa operatio de qua inquiritur, sed propius accedat ad praxin.

Itaque de præcepto vero et perfecto operandi, pronuntiatum erit tale; *ut sit certum, liberum, et disponens sive in ordine*

[1] That is, with a corresponding decrease of volume.

ad actionem. Atque hoc ipsum idem est cum inventione Formæ veræ. Etenim Forma naturæ alicujus talis est ut, ea posita, natura data infallibiliter sequatur. Itaque adest perpetuo quando natura illa adest, atque eam universaliter affirmat, atque inest omni. Eadem Forma talis est ut, ea amota, natura data infallibiliter fugiat. Itaque abest perpetuo quando natura illa abest, eamque perpetuo abnegat, atque inest soli. Postremo, Forma vera talis est, ut naturam datam ex fonte aliquo essentiæ deducat quæ inest pluribus, et notior est naturæ [1] (ut loquuntur) quam ipsa Forma. Itaque de axiomate vero et perfecto sciendi, pronuntiatum et præceptum tale est; *ut inveniatur natura alia, quæ sit cum natura data convertibilis, et tamen sit limitatio naturæ notioris, instar generis veri.*[2] Ista autem duo pronuntiata, activum et contemplativum, res eadem sunt; et quod in Operando utilissimum, id in Sciendo verissimum.

V.

At præceptum sive axioma de transformatione corporum, duplicis est generis. Primum intuetur corpus, ut turmam sive conjugationem naturarum simplicium: ut in auro hæc conveniunt; quod sit flavum; quod sit ponderosum, ad pondus tale; quod sit malleabile aut ductile, ad extensionem talem; quod non fiat volatile, nec deperdat de quanto suo per ignem; quod fluat fluore tali; quod separetur et solvatur modis talibus; et similiter de cæteris naturis, quæ in auro concurrunt. Itaque hujusmodi axioma rem deducit ex Formis naturarum simpli-

[1] See note on *Distrib. Operis*, p. 137.

[2] Let us adopt, for distinctness of expression, the theory commonly known as Boscovich's, — a theory which forms the basis of the ordinary mathematical theories of light, of heat, and of electricity. This theory supposes all bodies to be constituted of inextended atoms or centres of force, each of which attracts or repels and is attracted or repelled by all the rest. All the phenomena of nature are thus ascribed to mechanical forces, and all the differences which can be conceived to exist between two bodies, — gold, say, and silver, — can only arise either from the different configuration of the centres of force, or from the different law by which they act on one another.

Assuming the truth of this theory, the question, why are some bodies transparent and others not so — in other words, what is the essential cause of transparency which is precisely what Bacon would call the form of transparency,—is to be answered by saying that a certain configuration of the centres of force, combined with the existence of a certain law of force, constitutes such a system that the vibrations of the luminiferous ether pass through it. What this configuration or this law may be, is a question which the present state of mathematical physics does not enable us to answer; but there is no reason *à priori* why in time to come it may not receive a complete solution. If it does, we shall then have arrived at a knowledge, on Boscovich's theory, of the form of transparency. Those who are acquainted with the recent progress of physical science know that questions of this kind, so far from being rejected as the questions of a mere dreamer, are thought to be of the highest interest and importance, and that no inconsiderable advance has already been made towards the solution of some at least among them.

cium. Nam qui Formas et modos novit superinducendi flavi, ponderis, ductilis, fixi, fluoris, solutionum, et sic de reliquis, et eorum graduationes et modos, videbit et curabit ut ista conjungi possint in aliquo corpore, unde sequatur transformatio in aurum.[1] Atque hoc genus operandi pertinet ad actionem primariam. Eadem enim est ratio generandi naturam unam aliquam simplicem, et plures; nisi quod arctetur magis et restringatur homo in operando, si plures requirantur, propter difficultatem tot naturas coadunandi; quæ non facile conveniunt, nisi per vias naturæ tritas et ordinarias. Utcunque tamen dicendum est, quod iste modus operandi (qui naturas intuetur simplices, licet in corpore concreto) procedat ex iis quæ in natura sunt constantia et æterna et catholica, et latas præbeat potentiæ humanæ vias, quales (ut nunc sunt res) cogitatio humana vix capere aut repræsentare possit.

At secundum genus axiomatis (quod a *latentis processus* inventione pendet) non per naturas simplices procedit, sed per concreta corpora, quemadmodum in natura inveniuntur, cursu ordinario. Exempli gratia; in casu ubi fit inquisitio, ex quibus initiis, et quo modo, et quo processu, aurum aut aliud quodvis metallum aut lapis generetur, a primis menstruis aut rudimentis suis usque ad mineram perfectam; aut similiter, quo processu herbæ generentur, a primis concretionibus succorum in terra, aut a seminibus, usque ad plantam formatam, cum universa illa successione motus, et diversis et continuatis naturæ nixibus; similiter, de generatione ordinatim explicata animalium, ab initu ad partum; et similiter de corporibus aliis.

Enimvero neque ad generationes corporum tantum spectat hæc inquisitio, sed etiam ad alios motus et opificia naturæ. Exempli gratia; in casu ubi fit inquisitio, de universa serie et continuatis actionibus alimentandi, a prima receptione alimenti ad assimilationem perfectam; aut similiter de motu voluntario in animalibus, a prima impressione imaginationis et continuatis nixibus spiritus usque ad flexiones et motus artuum; aut de explicato motu linguæ et labiorum et instrumentorum reliquorum usque ad editionem vocum articulatarum. Nam hæc quoque spectant ad naturas concretas, sive collegiatas et

[1] "On pourroit trouver le moyen de contrefaire l'or en sorte qu'il satisferoit à toutes les épreuves qu'on en a jusqu'ici; mais on pourroit aussi découvrir alors une nouvelle manière d'essai, qui donneroit le moyen de distinguer l'or naturel de cet or fait par artifice . . . . nous pourrions avoir une définition plus parfaite de l'or que nous n'en avons présentement."— *Leibnitz, Nouv. Ess. sur l'Entendement*, c. 2.

in fabrica; et intuentur veluti consuetudines naturæ particulares et speciales, non leges fundamentales et communes, quæ constituunt Formas. Veruntamen omnino fatendum est, rationem istam videri expeditiorem et magis sitam in propinquo, et spem injicere magis, quam illam primariam.

At pars Operativa similiter, quæ huic parti Contemplativæ respondet, operationem extendit et promovet ab iis quæ ordinario in natura inveniuntur ad quædam proxima, aut a proximis non admodum remota; sed altiores et radicales operationes super naturam pendent utique ab axiomatibus primariis. Quinetiam ubi non datur homini facultas operandi, sed tantum sciendi, ut in cœlestibus (neque enim ceditur homini operari in cœlestia, aut ea immutare aut transformare), tamen inquisitio facti ipsius sive veritatis rei, non minus quam cognitio causarum et consensuum, ad primaria illa et catholica axiomata de naturis simplicibus (veluti de natura rotationis spontaneæ, attractionis sive virtutis magneticæ, et aliorum complurium quæ magis communia sunt quam ipsa cœlestia) refertur. Neque enim speret aliquis terminare quæstionem utrum in motu diurno revera terra aut cœlum rotet, nisi naturam rotationis spontaneæ prius comprehenderit.

VI.

Latens autem *Processus*, de quo loquimur, longe alia res est quam animis hominum (qualiter nunc obsidentur) facile possit occurrere. Neque enim intelligimus mensuras quasdam aut signa aut scalas processus in corporibus spectabiles; sed plane processum continuatum, qui maxima ex parte sensum fugit.

Exempli gratia; in omni generatione et transformatione corporum, inquirendum quid deperdatur et evolet, quid maneat, quid accedat; quid dilatetur, quid contrahatur; quid uniatur, quid separetur; quid continuetur, quid abscindatur; quid impellat, quid impediat; quid dominetur, quid succumbat; et alia complura.

Neque hic rursus, hæc tantum in generatione aut transformatione corporum quærenda sunt; sed et in omnibus aliis alterationibus et motibus similiter inquirendum quid antecedat, quid succedat; quid sit incitatius, quid remissius; quid motum præbeat, quid regat; et hujusmodi. Ista vero omnia scientiis (quæ nunc pinguissima Minerva et prorsus inhabili contexuntur) incognita sunt et intacta. Cum enim omnis actio naturalis per minima transigatur, aut saltem per illa quæ sunt minora quam

ut sensum feriant[1], nemo se naturam regere aut vertere posse speret, nisi illa debito modo comprehenderit et notaverit.

VII.

Similiter, inquisitio et inventio *latentis schematismi* in corporibus res nova est, non minus quam inventio *latentis processus* et Formæ.[2] Versamur enim plane adhuc in atriis naturæ, neque ad interiora paramus aditum. At nemo corpus datum nova natura dotare vel in novum corpus fœliciter et apposite transmutare potest, nisi corporis alterandi aut transformandi bonam habuerit notitiam. In modos enim vanos incurret, aut saltem difficiles et perversos, nec pro corporis natura in quod operatur. Itaque ad hoc etiam via plane est aperienda et munienda.

Atque in anatomia corporum organicorum (qualia sunt hominis et animalium) opera sane recte et utiliter insumitur, et videtur res subtilis et scrutinium naturæ bonum. At hoc genus anatomiæ spectabile est, et sensui subjectum, et in corporibus tantum organicis locum habet. Verum hoc ipsum obvium quiddam est et in promptu situm, præ anatomia vera schematismi latentis in corporibus quæ habentur pro similaribus[3]: præsertim in rebus specificatis[4] et earum partibus, ut ferri, lapidis; et partibus similaribus plantæ, animalis; veluti radicis, folii, floris, carnis, sanguinis, ossis, etc. At etiam in hoc genere non prorsus cessavit industria humana; hoc ipsum enim innuit separatio corporum similarium per distillationes et alios solutionum modos, ut dissimilaritas compositi per congregationem

[1] *i. e.* Every natural action depends on the ultimate particles of bodies, or at least on parts too small to strike the sense.

[2] The distinction between the Latent Process and Latent Schematism in the absolute way in which it is here stated, involves an assumption which the progress of science will probably show to be unfounded; namely, that bodies apparently at rest are so molecularly. Whereas all analogy and the fact that they act on the senses by acting mechanically on certain deferent media combine to show that we ought to consider bodies even at rest as dynamical and not as statical entities. On this view there is no difficulty in understanding the nature of what appear to be spontaneous changes, because every dynamical system carries within itself the seeds of its own decay, except in particular cases; that is, the type of motion so alters, with greater or less rapidity, that the sensible qualities associated with it pass away. The introduction of the idea of unstable equilibrium in connexion with organic chemistry, was a step in the direction which molecular Physics will probably soon take.

[3] *i. e.* that are thought to be of uniform structure—made up of parts similar to one another.

[4] *i e.* in things that have a specific character. In Bacon's time only certain things were supposed to belong to natural *species*, all others being merely *elementary*. A ruby has a specific character, is *specificatum*; common stone or rock *non ita*;—they are mere modifications of the element earth, &c. A "specific virtue" is a virtue given by a thing's specific character, transcending the qualities of the elements it consists of. [See note on *De Augm.* ii. 3.]

partium homogenearum appareat.[1] Quod etiam ex usu est, et facit ad id quod quærimus; licet sæpius res fallax sit; quia complures naturæ separationi imputantur et attribuuntur, ac si prius substitissent in composito, quas revera ignis et calor et alii modi apertionum de novo indunt et superinducunt. Sed et hæc quoque parva pars est operis ad inveniendum Schematismum verum in composito; qui Schematismus res est longe subtilior et accuratior, et ab operibus ignis potius confunditur quam eruitur et elucescit.

Itaque facienda est corporum separatio et solutio, non per ignem certe, sed per rationem et Inductionem veram, cum experimentis auxiliaribus; et per comparationem ad alia corpora, et reductionem ad naturas simplices et earum Formas quæ in composito conveniunt et complicantur; et transeundum plane a Vulcano ad Minervam, si in animo sit veras corporum texturas et Schematismos (unde omnis occulta atque, ut vocant, specifica proprietas et virtus in rebus pendet; unde etiam omnis potentis alterationis et transformationis norma educitur) in lucem protrahere.

Exempli gratia; inquirendum, quid sit in omni corpore spiritus, quid essentiæ tangibilis; atque ille ipse spiritus, utrum sit copiosus et turgeat, an jejunus et paucus; tenuis, aut crassior; magis aëreus, aut igneus; acris, aut deses; exilis, aut robustus; in progressu, aut in regressu; abscissus, aut continuatus; consentiens cum externis et ambientibus, aut dissentiens; etc. Et similiter essentia tangibilis (quæ non pauciores recipit differentias quam spiritus) atque ejus villi et fibræ et omnimoda textura, rursus autem collocatio spiritus per corpoream molem, ejusque pori, meatus, venæ et cellulæ, et rudimenta sive tentamenta corporis organici, sub eandem inquisitionem cadunt. Sed et in his quoque, atque adeo in omni *latentis schematismi* inventione, lux vera et clara ab Axiomatibus primariis immittitur, quæ certe caliginem omnem et subtilitatem discutit.

VIII.

Neque propterea res deducetur ad Atomum, qui præsupponit Vacuum et materiam non fluxam (quorum utrumque falsum est), sed ad particulas veras, quales inveniuntur. Neque rursus est quod exhorreat quispiam istam subtilitatem, ut inexplicabilem; sed contra, quo magis vergit inquisitio ad naturas simplices, eo

[1] That the complex structure of the compound may be made apparent by bringing together its several homogeneous parts.

magis omnia erunt sita in plano et perspicuo; translato negotio a multiplici in simplex, et ab incommensurabili ad commensurabile, et a surdo ad computabile, et ab infinito et vago ad definitum et certum; ut fit in elementis literarum et tonis concentuum. Optime autem cedit inquisitio naturalis, quando physicum terminatur in mathematico. At rursus multitudinem aut fractiones nemo reformidet. In rebus enim quæ per numeros transiguntur, tam facile quis posuerit aut cogitaverit millenarium quam unum, aut millesimam partem unius quam unum integrum.

IX.

Ex duobus generibus axiomatum quæ superius posita sunt, oritur vera divisio philosophiæ et scientiarum; translatis vocabulis receptis (quæ ad indicationem rei proxime accedunt) ad sensum nostrum. Videlicet, ut inquisitio *Formarum*, quæ sunt (ratione certe, et sua lege[1]) æternæ et immobiles, constituat *Metaphysicam;* inquisitio vero *Efficientis*, et *Materiæ*, et *Latentis Processus*, et *Latentis Schematismi* (quæ omnia cursum naturæ communem et ordinarium, non leges fundamentales et æternas respiciunt) constituat *Physicam:* atque his subordinentur similiter practicæ duæ; Physicæ Mechanica; Metaphysicæ (perpurgato nomine) Magia, propter latas ejus vias et majus imperium in naturam.

X.

Posito itaque doctrinæ scopo, pergendum ad præcepta; idque ordine minime perverso aut perturbato. Atque indicia de Interpretatione Naturæ complectuntur partes in genere duas; primam de educendis aut excitandis axiomatibus ab experientia; secundam de deducendis aut derivandis experimentis novis ab axiomatibus. Prior autem trifariam dividitur; in tres nempe ministrationes; ministrationem ad Sensum, ministrationem ad Memoriam, et ministrationem ad Mentem sive Rationem.[2]

[1] "In principle at least and in their essential law:" meaning that God could change them, but that this change would be above reason and a change of the law of the form, otherwise unchangeable. The phrase is a saving clause. Perhaps we should read "ratione suâ et lege"—in their principle and law.

[2] Compare *Partis secundæ Delineatio;* and for an explanation of the discrepancy see General Preface, § 10. According to the order proposed in the *Delineatio*, the *ministratio ad sensum* was to contain three parts, of which the first two are not mentioned here: namely, 1st, "Quomodo bona notio constituatur et eliciatur, ac quomodo testatio sensus, quæ semper est ex analogia hominis, ad analogiam mundi reducatur et rectificetur;" 2dly, "Quomodo ea quæ sensum effugiunt aut subtilitate totius corporis, aut partium minutiis, aut loci distantia, aut tarditate vel etiam velocitate motus, aut familiaritate objecti, aut aliis, in ordinem sensus redigantur; ac insuper in casu quo adduci non possunt, quid faciendum, atque quomodo huic destitutioni

Primo enim paranda est Historia Naturalis et Experimentalis, sufficiens et bona; quod fundamentum rei est; neque enim fingendum aut excogitandum, sed inveniendum, quid natura faciat aut ferat.

Historia vero Naturalis et Experimentalis tam varia est et sparsa, ut intellectum confundat et disgreget, nisi sistatur et compareat ordine idoneo. Itaque formandæ sunt Tabulæ et Coordinationes Instantiarum, tali modo et instructione ut in eas agere possit intellectus.

Id quoque licet fiat, tamen intellectus sibi permissus et sponte movens incompetens est et inhabilis ad opificium axiomatum, nisi regatur et muniatur. Itaque tertio, adhibenda est Inductio legitima et vera, quæ ipsa Clavis est Interpretationis. Incipiendum autem est a fine, et retro pergendum ad reliqua.[1]

XI.

Inquisitio Formarum sic procedit; super naturam datam primo facienda est comparentia[2] ad Intellectum omnium Instantiarum notarum, quæ in eadem natura conveniunt, per materias licet dissimillimas. Atque hujusmodi collectio facienda est historice, absque contemplatione præfestina, aut subtilitate aliqua majore. Exempli gratia; in inquisitione de Forma Calidi.

Instantiæ convenientes in natura Calidi.

1. Radii solis, præsertim æstate et meridie.
2. Radii solis reflexi et constipati, ut inter montes, aut per parietes, et maxime omnium in speculis comburentibus.
3. Meteora ignita.
4. Fulmina comburentia.
5. Eructationes flammarum ex cavis montium, etc.
6. Flamma omnis.
7. Ignita solida.
8. Balnea calida naturalia.

vel per instrumenta, vel per graduum observationem peritam, vel per corporum proportionatorum ex sensibilibus ad insensibilia indicationes, vel per alias vias ac substitutiones, sit subveniendum." I suppose Bacon had now determined to transfer these to the third ministration—the *ministratio ad Rationem*; and to treat of them under the heads *adminicula* et *rectificationes* inductionis. See infra, § 21.; and observe that the full exposition of the *Instantiæ supplementi*, and *Instantiæ persecantes* (both of which belong to the second of the two parts above mentioned) was reserved for the section relating to the *adminicula Inductionis*. See §§ 42, 43.—*J. S.*

[1] *i. e.* Of this, which is the last (namely the method of interpretation by induction based on exclusions), we must speak first, and then go back to the other ministrations.

[2] This is properly a law term, and is equivalent to "appearance" in such phrases as "to enter an appearance," &c. It is also said to be used for the vadimonium given to secure an appearance on an appointed day. See Ducange in voc.

9. Liquida ferventia, aut calefacta.

10. Vapores et fumi ferventes, atque aër ipse, qui fortissimum et furentem suscipit calorem, si concludatur; ut in reverberatoriis.[1]

11. Tempestates aliquæ sudæ per ipsam constitutionem aëris, non habita ratione temporis anni.

12. Aër conclusus et subterraneus in cavernis nonnullis, præsertim hyeme.

13. Omnia villosa, ut lana, pelles animalium, et plumagines, habent nonnihil teporis.

14. Corpora omnia, tam solida quam liquida et tam densa quam tenuia (qualis est ipse aër), igni ad tempus approximata.

15. Scintillæ ex silice et chalybe per fortem percussionem.

16. Omne corpus fortiter attritum, ut lapis, lignum, pannus, etc.; adeo ut temones et axes rotarum aliquando flammam concipiant; et mos excitandi ignis apud Indos Occidentales fuerit per attritionem.

17. Herbæ virides et humidæ simul conclusæ et contrusæ, ut rosæ, pinsæ[2] in corbibus; adeo ut fœnum, si repositum fuerit madidum, sæpe concipiat flammam.[3]

18. Calx viva, aqua aspersa.

19. Ferrum, cum primo dissolvitur per aquas fortes in vitro, idque absque ulla admotione ad ignem: et stannum similiter, etc., sed non adeo intense.

[1] That is, furnaces in which the flame is made to return on itself by impeding its direct course.

[2] Pisæ in the original edition.

[3] "That seeds when germinating, as they lie heaped in large masses, evolve a considerable degree of heat, is a fact long known from the malting of grain; but the cause of it was incorrectly sought for in a process of fermentation. To Göppert (*Ueber Würmeentwickelung in der lebenden Pflanze*) is due the merit of having demonstrated that such is not the case, but that the evolution of heat is connected with the process of germination. Seeds of very different chemical composition (of different grains, of Hemp, Clover, *Spergula*, *Brassica*, &c.), made to germinate in quantities of about a pound, became heated, at a temperature of the air of 48° — 66°, to 59°—120° Fahr.

"It was likewise shown by Göppert that full-grown plants also, such as Oats, Maize, *Cyperus esculentus*, *Hyoscyamus*, *Sedum acre*, &c., laid together in heaps and covered with bad conductors of heat, cause a thermometer placed among them to rise about 2°—7° (*Spergula* as much as 22°) above the temperature of the air. . . .

"A very great evolution of heat occurs in the blossom of the *Aroideæ*. This is considerable even in our *Arum maculatum*, and according to Dutrochet's researches (*Comptes rendus*, 1839, 695.) rises to 25°—27° above the temperature of the air. But this phenomenon is seen in a far higher degree in *Colocasia odora*, in which plant it has been investigated by Brongniart (*Nouv. Ann. d. Muséum*, iii.). Vrolik and Vriese (*Ann. des Sc. Nat.*, sec. ser. v. 134.), and Van Beek and Bersgma (*Obs. thermo-élect. s. l'élév. de températ. des Fleurs d. Colocas. odor.* 1838). These last observers found the maximum of heat 129°, when the temperature of the air was 79°." — Mohl *On the Vegetable Cell*, translated by Arthur Henfrey, Lond. 1852, pp. 101. and 102.

20. Animalia, præsertim et perpetuo per interiora; licet in insectis calor ob parvitatem corporis non deprehendatur ad tactum.

21. Fimus equinus, et hujusmodi excrementa animalium recentia.

22. Oleum forte sulphuris et vitrioli exequitur opera caloris, in linteo adurendo.

23. Oleum origani, et hujusmodi, exequitur opera caloris, in adurendis ossibus dentium.

24. Spiritus vini fortis et bene rectificatus exequitur opera caloris; adeo ut, si albumen ovi in eum injiciatur, concrescat et albescat, fere in modum albuminis cocti; et panis injectus torrefiat et incrustetur, ad modum panis tosti.[1]

25. Aromata et herbæ calidæ, ut dracunculus, nasturtium vetus, etc. licet ad manum non sint calida (nec integra, nec pulveres eorum), tamen ad linguam et palatum parum masticata percipiuntur calida, et quasi adurentia.

26. Acetum forte, et omnia acida, in membro ubi non sit epidermis, ut in oculo, lingua, aut aliqua alia parte vulnerata, et cute detecta, dolorem cient, non multum discrepantem ab eo qui inducitur a calido.

27. Etiam frigora acria et intensa inducunt sensum quendam ustionis;

"Nec Boreæ penetrabile frigus adurit." [2]

28. Alia.

Hanc *Tabulam Essentiæ et Præsentiæ* appellare consuevimus.

XII.

Secundo, facienda est comparentia ad Intellectum Instantiarum quæ natura data privantur: quia Forma (ut dictum est)

[1] The analogy which Bacon here remarks, arises probably, in the second instance, from the desiccative power due to the strong affinity of alcohol for water. The French chemist Lassaigne found, I believe, that alcohol extracted a red colouring matter from unboiled lobster shells; but I am not aware that the modus operandi has in this case been explained. But by far the most remarkable case of what may be called simulated heat, is furnished by the action of carbonic acid gas on the skin. Of late years baths of this gas have been used medicinally; but M. Boussingault long since remarked the sensation of heat which it produces. He states that at Quindiu in New Granada there are sulphur works, and that at various points nearly pure carbonic acid gas escapes from shallow excavations in the surface, containing, however, a trace of hydro-sulphuric acid; that the temperature of this issuing stream of gas is lower than the external air, but that the sensation is the same as that produced by a hot-air bath of perhaps from 40° to 45° or 48° centigrade (104° to 118° Fahr.). As this effect has not been noticed in carbonic acid gas prepared artificially, it is probable that it requires for its production the gas to be in motion; so that the necessary conditions are not present when the hand is inserted into a jar of the gas.

[2] Virg. Georg. I. 93.

non minus abesse debet ubi natura abest, quam adesse ubi adest. Hoc vero infinitum esset in omnibus.

Itaque subjungenda sunt negativa affirmativis, et privationes inspiciendæ tantum in illis subjectis quæ sunt maxime cognata illis alteris in quibus natura data inest et comparet. Hanc *Tabulam Declinationis*, sive *Absentiæ in proximo*, appellare consuevimus.

Instantiæ in proximo, quæ privantur natura Calidi.

Ad Instantiam primam *affirmativam*, Instantia prima *negativa* vel subjunctiva.

1. Lunæ et stellarum et cometarum radii non inveniuntur calidi ad tactum[1]: quinetiam observari solent acerrima frigora in pleniluniis. At stellæ fixæ majores, quando sol eas subit aut iis approximatur, existimantur fervores solis augere et intendere; ut fit cum sol sistitur in Leone, et diebus canicularibus.

Ad 2am 2æ. 2. Radii solis in media (quam vocant) regione aëris non calefaciunt; cujus ratio vulgo non male redditur; quia regio illa nec satis appropinquat ad corpus solis, unde radii emanant, nec etiam ad terram, unde reflectuntur. Atque hoc liquet ex fastigiis montium (nisi sint prælti), ubi nives perpetuo durant. Sed contra notatum est a nonnullis, quod in cacumine Picus de Tenariph, atque etiam in Andis Peruviæ, ipsa fastigia montium nive destituta sint; nivibus jacentibus tantum inferius in ascensu. Atque insuper aër illis ipsis verticibus montium deprehenditur minime frigidus, sed tenuis tantum et acer; adeo ut in Andis pungat et vulneret oculos per nimiam acrimoniam, atque etiam pungat os ventriculi, et inducat vomitum. Atque ab antiquis notatum est, in vertice Olympi tantam fuisse aëris tenuitatem, ut necesse fuerit illis qui eo ascenderant secum deferre spongias aceto et aqua madefactas, easque ad os et nares subinde apponere, quia aër ob tenuitatem non sufficiebat respirationi[2]: in quo vertice etiam relatum est, tantam fuisse serenitatem et tranquillitatem a pluviis et nivibus et ventis, ut sacrificantibus literæ descriptæ digito in cineribus sacrificiorum super aram Jovis, manerent in annum proximum absque ulla perturbatione.[3] Atque etiam hodie

[1] M. Melloni has recently succeeded in making sensible the moon's calorific rays.

[2] *i. e.* It was insufficient for the cooling of the blood, which according to Aristotle was the end of respiration.

[3] Aristotle seems to be the first person who mentions this notion. See the *Problems* xxvi. 36.; where however he speaks of Athos and *οἱ τοιοῦτοι*, and not of Olympus. The passages on the subject are to be found in Ideler's *Meteorologia veterum Græcorum et Romanorum* (Berlin, 1832), at p. 81. Compare his edition of the *Meteoro-*

ascendentes ad verticem Picus de Tenariph eo vadunt noctu et non interdiu; et paulo post ortum solis monentur et excitantur a ducibus suis ut festinent descendere, propter periculum (ut videtur) a tenuitate aëris, ne solvat spiritus et suffocet.[1]

Ad 2am 3a. . Reflexio radiorum solis, in regionibus prope circulos polares, admodum debilis et inefficax invenitur in calore: adeo ut Belgæ, qui hybernarunt in Nova Zembla[2], cum expectarent navis suæ liberationem et deobstructionem a glaciali mole (quæ eam obsederat) per initia mensis Julii spe sua frustrati sint, et coacti scaphæ se committere. Itaque radii solis directi videntur parum posse, etiam super terram planam; nec reflexi etiam, nisi multiplicentur et uniantur; quod fit cum sol magis vergit ad perpendiculum; quia tum incidentia radiorum facit angulos acutiores, ut lineæ radiorum sint magis in propinquo: ubi contra in magnis obliquitatibus solis anguli sint valde obtusi, et proinde lineæ radiorum magis distantes. Sed interim notandum est, multas esse posse operationes radiorum solis, atque etiam ex natura Calidi, quæ non sunt proportionatæ ad tactum nostrum: adeo ut respectu nostri non operentur usque ad calefactionem, sed respectu aliorum nonnullorum corporum exequantur opera Calidi.

logies of Aristotle, where he has given *in extenso* the passage in which Geminus speaks in the same manner of Mount Cyllene in Arcadia, and also a similar statement made by Philoponus with respect to Olympus. The whole class of stories seem (as Ideler following Lobeck remarks) to have somewhat of a mythical character. G. Bruno apparently confounded Philoponus with Alexander Aphrodisiensis, when in the *Cena di Cenere* he asserted that the latter mentions the sacrifices on the top of Olympus. In the passage on the subject in which we might expect to find him doing so, namely in his Commentary on the *Meteorologies*, i. c. 3., he does not specify any particular mountain.

That there is no wind nor rain on Olympus is mentioned as a common opinion by St. Augustin, *De Civ. Dei*, xvi. 27. Compare Dante, *Purg.* xxviii. 112.

[1] Lest the animal spirits should swoon and be suffocated by the tenuity of the air.

[2] This of course refers to Barentz's expedition in search of a North-East passage. He passed the winter 1596–7 at Nova Zembla. [In Barentz's first voyage, 1594, he was stopped by the ice on the 13th of July, and obliged to return. In his third voyage, 1596, his first considerable check was on the 19th of July; after which he only succeeded in coasting round the northern point of Nova Zembla till the 26th of August, where the ship stuck fast and they were forced to leave her and winter on the island, and return in their boats in the beginning of June 1597. See the letter signed by the company: "Three Voyages by the North-East, &c.," Hackluyt Society, 1853, p. 191. This letter was begun on the 1st of June: "having till this day stayed for the time and opportunity in hope to get our ship loose, and now are clean out of hope thereof, for that it lieth shut up and enclosed in the ice," &c.: and ended on the 13th, "notwithstanding that while we were making ready to be gone, we had great wind out of the west and north-west, and yet find no alteration nor bettering in the weather, and therefore in the last extremity we left it." This narrative, written by Gerrit de Veer, one of the party, was first published in Dutch in 1598; translated into Latin and French the same year; into Italian in 1599; into English in 1609. See Introduction, p. cxviii. "Per initia mensis *Junii*," would have been more accurate.—*J. S.*]

Ad 2am 4a. Fiat hujusmodi experimentum. Accipiatur speculum[1] fabricatum contra ac fit in speculis comburentibus, et interponatur inter manum et radios solis; et fiat observatio, utrum minuat calorem solis, quemadmodum speculum comburens eundem auget et intendit. Manifestum est enim, quoad radios opticos, prout fabricatur speculum in densitate inæquali respectu medii et laterum, ita apparere simulachra magis diffusa aut magis contracta. Itaque idem videndum in calore.

Ad 2am 5a. Fiat experimentum diligenter, utrum per specula comburentia fortissima et optime fabricata radii lunæ possint excipi et colligi in aliquem vel minimum gradum teporis. Is vero gradus teporis si fortasse nimis subtilis et debilis fuerit, ut ad tactum percipi et deprehendi non possit, confugiendum erit ad vitra illa quæ indicant constitutionem aëris calidam aut frigidam; ita ut radii lunæ per speculum comburens incidant et jaciantur in summitatem vitri hujusmodi; atque tum notetur si fiat depressio aquæ per teporem.

Ad 2am 6a. Practicetur etiam vitrum comburens super calidum[2] quod non sit radiosum aut luminosum[3]; ut ferri et lapidis calefacti sed non igniti, aut aquæ ferventis, aut similium; et notetur utrum fiat augmentum et intentio calidi, ut in radiis solis.

Ad 2am 7a. Practicetur etiam speculum comburens in flamma communi.

Ad 2am 8a. Cometarum (si et illos numerare inter meteora libuerit)[4] non deprehenditur constans aut manifestus effectus in augendis ardoribus anni, licet siccitates sæpius inde sequi notatæ sint. Quinetiam trabes et columnæ lucidæ et chasmata et similia apparent sæpius temporibus hybernis quam æstivis; et maxime per intensissima frigora, sed conjuncta cum siccitatibus. Fulmina tamen et coruscationes et tonitrua raro eveniunt hyeme, sed sub tempus magnorum fervorum. At stellæ (quas

[1] "Speculum," used for *lens*. Read "specillum," the common word. *il* passes very easily into *u*; and probably the transition was more facile in the cursive hand.

[2] So in the original; qy. *corpus calidum*.—*J. S.*

[3] Mersenne says the greater number of the experiments mentioned in the second book of the *Novum Organum* had already been made, and mentions particularly, as if he had himself tried it, the reflexion of all kinds of heat by a burning mirror. He also asserts that light is always accompanied by heat. *De la Vérité des Sciences* (1625), p. 210.

[4] That there was no reason for supposing comets to be more than merely meteoric exhalations is the thesis maintained, and doubtless with great ability, by Galileo in his *Saggiatore*, — the true view, or at least a nearer approach to it, having been propounded by the Jesuit Grossi. Bacon perhaps alludes to this controversy.

vocant) cadentes existimantur vulgo magis constare ex viscosa aliqua materia splendida et accensa, quam esse naturæ igneæ fortioris. Sed de hoc inquiratur ulterius.

Ad 4am 9a. Sunt quædam coruscationes quæ præbent lumen sed non urunt; eæ vero semper fiunt sine tonitru.

Ad 5am 10a. Eructationes et eruptiones flammarum inveniuntur non minus in regionibus frigidis quam calidis; ut in Islandia et Groenlandia; quemadmodum et arbores per regiones frigidas magis sunt quandoque inflammabiles et magis piceæ ac resinosæ quam per regiones calidas; ut fit in abiete, pinu, et reliquis; verum in quali situ et natura soli hujusmodi eruptiones fieri soleant, ut possimus Affirmativæ subjungere Negativam, non satis quæsitum est.

Ad 6am 11a. Omnis flamma perpetuo est calida magis aut minus, neque omnino subjungitur Negativa; et tamen referunt ignem fatuum (quem vocant), qui etiam aliquando impingitur in parietem[1], non multum habere caloris; fortasse instar flammæ spiritus vini, quæ clemens et lenis est. Sed adhuc lenior videtur ea flamma quæ in nonnullis historiis fidis et gravibus invenitur apparuisse circa capita et comas puerorum et virginum; quæ nullo modo comas adurebat, sed molliter circum eas trepidabat. Atque certissimum est, circa equum in itinere sudantem noctu et suda tempestate apparuisse quandoque coruscationem quandam absque manifesto calore. Atque paucis abhinc annis, notissimum est et pro miraculo quasi habitum gremiale cujusdam puellæ paulo motum aut fricatum coruscasse; quod fortasse factum est ob alumen aut sales quibus gremiale tinctum erat paulo crassius hærentia et incrustata, et ex fricatione fracta. Atque certissimum est saccharum omne, sive conditum (ut vocant) sive simplex, modo sit durius, in tenebris fractum aut cultello scalptum coruscare. Similiter aqua marina et salsa noctu interdum invenitur remis fortiter percussa coruscare. Atque etiam in tempestatibus spuma maris fortiter agitata noctu coruscat; quam coruscationem Hispani *pulmonem marinum* vocant.[2] De illa flamma autem quam antiqui nautæ vocabant *Castorem et Pollucem*, et

[1] *i. e.* Which sometimes even settles on a wall.

[2] The phrase "pulmo marino" is as much Italian as Spanish,—except of course, that in Italian "pulmo" is replaced by "polmo,"— and is merely a translation of πνεύμων θαλάσσιος, which is used by Dioscorides, *De Materiâ Medicâ*, ii. 39. The luminous appearance arises apparently from a molluscous animal, which in texture is like the substance of the lungs, from which circumstance it derives the name which Dioscorides gives it. Cf. *De Aug.* iv. 3.

moderni *Focum Sancti Ermi*[1], qualem calorem habeat non satis quæsitum est.

Ad 7am 12a. Omne ignitum ita ut vertatur in ruborem igneum etiam sine flamma perpetuo calidum est, neque huic Affirmativæ subjungitur Negativa; sed quod in proximo est videtur esse lignum putre, quod splendet noctu neque tamen deprehenditur calidum; et squamæ piscium putrescentes, quæ etiam splendent noctu, nec inveniuntur ad tactum calidæ; neque etiam corpus cicindelæ aut muscæ (quam vocant Luciolam) calidum ad tactum deprehenditur.

Ad 8am 13a. De balneis calidis, in quo situ et natura soli emanare soleant non satis quæsitum est; itaque non subjungitur Negativa.

Ad 9am 14a. Liquidis ferventibus subjungitur Negativa ipsius liquidi in natura sua. Nullum enim invenitur liquidum tangibile quod sit in natura sua et maneat constanter calidum, sed superinducitur ad tempus tantum calor, ut natura ascititia[2]: adeo ut quæ potestate et operatione sunt maxime calida, ut spiritus vini, olea aromatum chymica, etiam olea vitrioli et sulphuris, et similia, quæ paulo post adurunt, ad primum tactum sint frigida. Aqua autem balneorum naturalium excepta in vas aliquod et separata a fontibus suis defervescit perinde ac aqua igne calefacta. At verum est corpora oleosa ad tactum paulo minus esse frigida quam aquea; ut oleum minus quam aqua, sericum minus quam linteum. Verum hoc pertinet ad *Tabulam Graduum de Frigido.*

Ad 10am 15a. Similiter vapori fervido subjungitur Negativa naturæ ipsius vaporis, qualis apud nos invenitur. Etenim exhalationes ex oleosis, licet facile inflammabiles, tamen non inveniuntur calidæ, nisi a corpore calido recenter exhalaverint.

Ad 10am 16a. Similiter aëri ipsi ferventi subjungitur Negativa naturæ aëris ipsius. Neque enim invenitur apud nos aër calidus; nisi fuerit aut conclusus, aut attritus, aut manifeste calefactus a sole, igne, aut aliquo alio corpore calido.

Ad 11am 17a. Subjungitur Negativa tempestatum frigidarum

[1] "O lume vivo, que a maritima gente
Tem por santo em tempo de tormenta."
Os Lusiadas de Camoẽs, canto v. est. 18.
I take this quotation from Humboldt's *Kosmos*, ii. p. 122.

[2] E converso, calor is *not* a natura adscititia to solids. In modern physics this distinction would be altogether without a meaning. That a hot liquid returns after a while to a cold state, was adduced as an argument for the existence of substantial forms.

magis quam pro ratione temporis anni, quæ eveniunt apud nos flante Euro et Borea; quemadmodum et contrariæ tempestates eveniunt flante Austro et Zephyro. Etiam inclinatio ad pluviam (præsertim temporibus hyemalibus) comitatur tempestatem tepidam; at gelu contra frigidam.

Ad 12am 18a. Subjungitur Negativa aëris conclusi in cavernis tempore æstivo. At de aëre concluso omnino diligentius inquirendum. Primo enim non absque causa in dubitationem venit qualis sit natura aëris quatenus ad calidum et frigidum in natura sua propria. Recipit enim aër calidum manifesto ex impressione cœlestium; frigidum autem fortasse ab expiratione terræ; et rursus in media (quam vocant) regione aëris a vaporibus frigidis et nivibus; ut nullum judicium fieri possit de aëris natura per aërem qui foras est et sub dio, sed verius foret judicium per aërem conclusum. Atqui opus est etiam ut aër concludatur in tali vasi et materia quæ nec ipsa imbuat aërem calido vel frigido ex vi propria nec facile admittat vim aëris extranei. Fiat itaque experimentum per ollam figularem multiplici corio obductam ad muniendam ipsam ab aëre extraneo, facta mora per tres aut quatuor dies in vase bene occluso; deprehensio autem fit post apertionem vasis vel per manum vel per vitrum graduum ordine applicatum.

Ad 13am 19a. Subest similiter dubitatio, utrum tepor in lana et pellibus et plumis et hujusmodi fiat ex quodam exili calore inhærente, quatenus excernuntur ab animalibus; aut etiam ob pinguedinem quandam et oleositatem, quæ sit naturæ congruæ cum tepore; vel plane ob conclusionem et fractionem aëris, ut in articulo præcedente dictum est. Videtur enim omnis aër abscissus a continuitate aëris forinseci habere nonnihil teporis. Itaque fiat experimentum in fibrosis quæ fiunt ex lino; non ex lana aut plumis aut serico, quæ excernuntur ab animatis. Notandum est etiam, omnes pulveres (ubi manifesto includitur aër) minus esse frigidos quam corpora integra ipsorum; quemadmodum etiam existimamus omnem spumam (utpote quæ aërem contineat) minus esse frigidam quam liquorem ipsum.

Ad 14am 20a. Huic non subjungitur Negativa. Nihil enim reperitur apud nos sive tangibile sive spiritale quod admotum igni non excipiat calorem. In eo tamen differunt, quod alia excipiant calorem citius, ut aër, oleum, et aqua; alia tardius, ut lapis et metalla. Verum hoc pertinet ad *Tabulam Graduum*.

Ad 15am 21a. Huic Instantiæ non subjungitur Negativa alia,

quam ut bene notetur non excitari scintillas ex silice et chalybe aut alia aliqua substantia dura nisi ubi excutiuntur minutiæ aliquæ ex ipsa substantia lapidis vel metalli, neque aërem attritum unquam per se generare scintillas, ut vulgo putant; quin et ipsæ illæ scintillæ ex pondere corporis igniti magis vergunt deorsum quam sursum, et in extinctione redeunt in quandam fuliginem corpoream.

Ad 16am 22a. Existimamus huic instantiæ non subjungi Negativam. Nullum enim invenitur apud nos corpus tangibile quod non ex attritione manifesto calescat; adeo ut veteres somniarent non inesse cœlestibus aliam viam aut virtutem calefaciendi nisi ex attritione aëris per rotationem rapidam et incitatam.[1] Verum in hoc genere ulterius inquirendum est utrum corpora quæ emittuntur ex machinis (qualia sunt pilæ ex tormentis) non ex ipsa percussione contrahant aliquem gradum caloris; adeo ut postquam deciderint inveniantur nonnihil calida. At aër motus magis infrigidat quam calefacit; ut in ventis et follibus et flatu oris contracti. Verum hujusmodi motus non est tam rapidus ut excitet calorem, et fit secundum totum, non per particulas; ut mirum non sit, si non generet calorem.

Ad 17am 23a. Circa hanc instantiam facienda est inquisitio diligentior. Videntur enim herbæ et vegetabilia viridia et humida aliquid habere in se occulti caloris. Ille vero calor tam tenuis est ut in singulis non percipiatur ad tactum, verum postquam illa adunata sint et conclusa, ut spiritus ipsorum non expiret in aërem sed se invicem foveat, tum vero oritur calor manifestus, et nonnunquam flamma in materia congrua.

Ad 18am 24a. Etiam circa hanc instantiam diligentior facienda est inquisitio. Videtur enim calx viva aqua aspersa concipere calorem vel propter unionem caloris qui antea distrahebatur (ut ante dictum est de herbis conclusis), vel ob irritationem et exasperationem spiritus ignei ab aqua, ut fiat quidam conflictus et antiperistasis. Utra vero res sit in causa facilius apparebit si loco aquæ immittatur oleum; oleum enim æque ac aqua

[1] See Arist. Meteorol. I. c. 2. sub finem; or De Cœlo, II. c. 7. It seems probable that Aristotle was influenced by a wish to secure the doctrine of the eternity of the universe, which he saw would be put in peril if celestial heat were ascribed to anything akin to combustion. We now know that the generation of heat, whether by friction, combustion, or otherwise, involves a loss of vis viva, and it is difficult to avoid the conclusion that the material universe sprang, at a finite distance of time ago, out of something wholly and inconceivably different from itself. Nothing is more remarkable than the way in which ontology here forces itself into physics.

valebit ad unionem spiritus inclusi, sed non ad irritationem. Etiam faciendum est experimentum latius tam in cineribus et calcibus diversorum corporum, quam per immissionem diversorum liquorum.

Ad 19am 25s. Huic instantiæ subjungitur Negativa aliorum metallorum quæ sunt magis mollia et fluxa. Etenim bracteolæ auri solutæ in liquorem per aquam regis nullum dant calorem ad tactum in dissolutione; neque similiter plumbum in aqua forti; neque etiam argentum vivum (ut memini); sed argentum ipsum parum excitat caloris, atque etiam cuprum (ut memini), sed magis manifesto stannum, atque omnium maxime ferrum et chalybs, quæ non solum fortem excitant calorem in dissolutione, sed etiam violentam ebullitionem.[1] Itaque videtur calor fieri per conflictum, cum aquæ fortes penetrant et fodiunt et divellunt partes corporis, et corpora ipsa resistunt. Ubi vero corpora facilius cedunt vix excitatur calor.

Ad 20am 26s. Calori animalium nulla subjungitur Negativa, nisi insectorum (ut dictum est) ob parvitatem corporis. Etenim in piscibus collatis ad animalia terrestria magis notatur gradus caloris quam privatio. In vegetabilibus autem et plantis nullus percipitur gradus caloris ad tactum, neque in lachrymis ipsorum, neque in medullis recenter apertis. At in animalibus magna reperitur diversitas caloris, tum in partibus ipsorum (alius est enim calor circa cor, alius in cerebro, alius circa externa), tum in accidentibus eorum, ut in exercitatione vehementi et febribus.

Ad 21am 27s. Huic instantiæ vix subjungitur Negativa. Quinetiam excrementa animalium non recentia manifeste habent calorem potentialem, ut cernitur in impinguatione soli.

Ad 22am et 23am 28s. Liquores (sive aquæ vocentur sive olea) qui habent magnam et intensam acrimoniam exequuntur opera caloris in divulsione corporum, atque adustione post aliquam moram; sed tamen ad ipsum tactum manus non sunt calidi ab initio. Operantur autem secundum analogiam[2] et poros corporis cui adjunguntur. Aqua enim regis aurum solvit, argentum

[1] This ebullition is of course not the *result* of the heat, but arises from the disengagement of gas during the action of the acid on the metal.

[2] This is another instance of the large sense given to the word analogia. Aqua regia is a mixture of nitric and hydrochloric acids. Its power of dissolving gold is ascribed by Davy to the liberation of chlorine by the mutual action of the two acids. The different result in the case of silver arises from the insolubility of chloride of silver.

minime; at contra aqua fortis argentum solvit, aurum minime; neutrum autem solvit vitrum; et sic de cæteris.

Ad 24am 29a. Fiat experimentum spiritus vini in lignis, ac etiam in butyro aut cera aut pice; si forte per calorem suum ea aliquatenus liquefaciat. Etenim instantia 24a ostendit potestatem ejus imitativam caloris in incrustationibus. Itaque fiat similiter experimentum in liquefactionibus. Fiat etiam experimentum per vitrum graduum sive calendare quod concavum sit in summitate sua per exterius; et immittatur in illud concavum exterius spiritus vini bene rectificatus, cum operculo ut melius contineat calorem suum; et notetur utrum per calorem suum faciat aquam descendere.

Ad 25am 30a. Aromata, et herbæ acres ad palatum, multo magis sumptæ interius, percipiuntur calida. Videndum itaque in quibus aliis materiis exequantur opera caloris. Atque referunt nautæ, cum cumuli et massæ aromatum diu conclusæ subito aperiuntur, periculum instare illis qui eas primo agitant et extrahunt a febribus et inflammationibus spiritus.[1] Similiter fieri poterit experimentum, utrum pulveres hujusmodi aromatum aut herbarum non arefaciant laridum et carnem suspensam super ipsos, veluti fumus ignis.

Ad 26am 31a. Acrimonia sive penetratio inest tam frigidis, qualia sunt acetum et oleum vitrioli, quam calidis, qualia sunt oleum origani et similia. Itaque similiter et in animatis cient dolorem, et in non animatis divellunt partes et consumunt. Neque huic instantiæ subjungitur Negativa. Atque in animatis nullus reperitur dolor nisi cum quodam sensu caloris.

Ad 27am 32a. Communes sunt complures actiones et calidi et frigidi, licet diversa admodum ratione. Nam et nives puerorum manus videntur paulo post urere; et frigora tuentur carnes a putrefactione, non minus quam ignis; et calores contrahunt corpora in minus, quod faciunt et frigida. Verum hæc et similia opportunius est referre ad Inquisitionem de Frigido.

XIII.

Tertio facienda est Comparentia ad Intellectum instantiarum in quibus natura de qua fit inquisitio inest secundum magis et minus; sive facta comparatione incrementi et decrementi in

[1] In the *Annals of Philosophy* a case is mentioned in which the effluvia arising on the opening of a large bark-store at Guayra were sufficiently powerful to cure a bad fever.

eodem subjecto, sive facta comparatione ad invicem in subjectis diversis. Cum enim Forma rei sit ipsissima res; neque differat res a Forma, aliter quam differunt apparens et existens, aut exterius et interius, aut in ordine ad hominem et in ordine ad universum [1]; omnino sequitur ut non recipiatur aliqua natura pro vera Forma, nisi perpetuo decrescat quando natura ipsa decrescit, et similiter perpetuo augeatur quando natura ipsa augetur. Hanc itaque tabulam *Tabulam Graduum* sive *Tabulam Comparativæ* appellare consuevimus.

Tabula Graduum sive *Comparativæ* in Calido.

Primo itaque dicemus de iis quæ nullum prorsus gradum caloris habent ad tactum, sed videntur habere potentialem tantum quendam calorem, sive dispositionem et præparationem ad calidum. Postea demum descendemus ad ea quæ sunt actu sive ad tactum calida, eorumque fortitudines et gradus.

1. In corporibus solidis et tangibilibus non invenitur aliquid quod in natura sua calidum sit originaliter. Non enim lapis aliquis, non metallum, non sulphur, non fossile aliquod, non lignum, non aqua, non cadaver animalis, inveniuntur calida. Aquæ autem calidæ in balneis videntur calefieri per accidens, sive per flammam aut ignem subterraneum, qualis ex Ætna et montibus aliis compluribus evomitur, sive ex conflictu corporum, quemadmodum calor fit in ferri et stanni dissolutionibus. Itaque gradus caloris in inanimatis, quatenus ad tactum humanum, nullus est; veruntamen illa gradu frigoris differunt; non enim æque frigidum est lignum ac metallum. Sed hoc pertinet ad *Tabulam Graduum in Frigido.*

2. Attamen quoad potentiales calores et præparationes ad flammam, complura inveniuntur inanimata admodum disposita, ut sulphur, naphtha, petrelæum.[2]

3. Quæ antea incaluerunt, ut fimus equinus ex animali, aut calx aut fortasse cinis aut fuligo ex igne, reliquias latentes quasdam caloris prioris retinent. Itaque fiunt quædam distillationes et separationes corporum per sepulturam in fimo equino, atque excitatur calor in calce per aspersionem aquæ; ut jam dictum est.

[1] "Res" is to be taken in a general sense, so as to include not only substances, but also what Bacon calls naturæ. It is therefore not to be translated as if it were synonymous with corpus; and in fact in a subsequent passage (II. § 50.) "res" and "corpus" are, so to speak, placed in opposition to each other. "Rerum formæ et Corporum schematismi."

[2] The Latin form of the word is *petroleum.*

4. Inter vegetabilia non invenitur aliqua planta sive pars plantæ (veluti lachryma aut medulla) quæ sit ad tactum humanum calida. Sed tamen (ut superius dictum est) herbæ virides conclusæ calescunt; atque ad interiorem tactum, veluti ad palatum aut ad stomachum aut etiam ad exteriores partes, post aliquam moram (ut in emplastris et unguentis) alia vegetabilia inveniuntur calida, alia frigida.

5. Non invenitur in partibus animalium, postquam fuerint mortuæ aut separatæ, aliquid calidum ad tactum humanum. Nam neque fimus equinus ipse, nisi fuerit conclusus et sepultus, calorem retinet. Sed tamen omnis fimus habere videtur calorem potentialem, ut in agrorum impinguatione. Et similiter, cadavera animalium hujusmodi habent latentem et potentialem calorem; adeo ut in cœmeteriis ubi quotidie fiunt sepulturæ terra calorem quendam occultum colligat, qui cadaver aliquod recenter impositum consumit longe citius quam terra pura. Atque apud orientales traditur inveniri textile quoddam tenue et molle, factum ex avium plumagine, quod vi innata butyrum solvat et liquefaciat in ipso leviter involutum.

6. Quæ impinguant agros, ut fimi omnis generis, creta, arena maris, sal, et similia, dispositionem nonnullam habent ad calidum.

7. Omnis putrefactio in se rudimenta quædam exilis caloris habet[1], licet non hucusque ut ad tactum percipiatur. Nam nec ea ipsa quæ putrefacta solvuntur in animalcula, ut caro, caseus, ad tactum percipiuntur calida; neque lignum putre, quod noctu splendet, deprehenditur ad tactum calidum. Calor autem in putridis quandoque se prodit per odores tetros et fortes.

8. Primus itaque caloris gradus, ex iis quæ ad tactum humanum percipiuntur calida, videtur esse calor animalium, qui bene magnam habet graduum latitudinem. Nam infimus gradus (ut in insectis) vix ad tactum deprenditur; summus autem gradus vix attingit ad gradum caloris radiorum solis in regionibus et temporibus maxime ferventibus, neque ita acris est quin tolerari possit a manu. Et tamen referunt de Constantio[2], aliisque nonnullis qui constitutionis et habitus corporis admodum sicci

[1] This is true of eremacausis rather than of real putrefaction. But the distinction belongs to the recent history of chemistry.

[2] The person here referred to is Constantius II., the son of Constantine the Great. The burning heat of the fever of which he died is mentioned by Ammianus Marcellinus, l. xxi. c. 15.

fuerunt, quod acutissimis febribus correpti ita incaluerint ut manum admotam aliquantulum urere visi sint.

9. Animalia, ex motu et exercitatione, ex vino et epulis, ex venere, ex febribus ardentibus, et ex dolore, augentur calore.

10. Animalia in accessibus febrium intermittentium a principio frigore et horrore corripiuntur, sed paulo post majorem in modum incalescunt; quod etiam faciunt a principio in causonibus et febribus pestilentialibus.

11. Inquiratur ulterius de calore comparato in diversis animalibus, veluti piscibus, quadrupedibus, serpentibus, avibus; atque etiam secundum species ipsorum, ut in leone, milvio, homine; nam ex vulgari opinione, pisces per interiora minus calidi sunt, aves autem maxime calidæ; præsertim columbæ, accipitres, struthiones.[1]

12. Inquiratur ulterius de calore comparato in eodem animali, secundum partes et membra ejus diversa. Nam lac, sanguis, sperma, ova, inveniuntur gradu modico tepida, et minus calida quam ipsa caro exterior in animali quando movetur aut agitatur. Qualis vero gradus sit caloris in cerebro, stomacho, corde, et reliquis, similiter adhuc non est quæsitum.

13. Animalia omnia, per hyemem et tempestates frigidas, secundum exterius frigent; sed per interiora etiam magis esse calida existimantur.

14. Calor cœlestium, etiam in regione calidissima atque temporibus anni et diei calidissimis, non eum gradum caloris obtinet qui vel lignum aridissimum vel stramen vel etiam linteum ustum incendat aut adurat, nisi per specula comburentia roboretur; sed tamen e rebus humidis vaporem excitare potest.

15. Ex traditione astronomorum ponuntur stellæ aliæ magis, aliæ minus calidæ. Inter planetas enim post solem ponitur Mars calidissimus, deinde Jupiter, deinde Venus[2]; ponuntur autem tanquam frigidi Luna et deinde omnium maxime Saturnus. Inter fixas autem ponitur calidissimus Sirius, deinde Cor Leonis, sive Regulus, deinde Canicula, etc.

16. Sol magis calefacit, quo magis vergit ad perpendiculum sive Zenith, quod etiam credendum est de aliis planetis, pro modulo suo caloris; exempli gratia, Jovem magis apud nos

[1] Struthio commonly means an ostrich, but it seems here to be used for a sparrow. — *J. S.*

[2] By some Venus was accounted cold and moist. Vide *Margarita Phil.* p. 627. Ptolemy, however, confirms what Bacon says of her.

calefacere cum positus sit sub Cancro aut Leone quam sub Capricorno aut Aquario.

17. Credendum est solem ipsum et planetas reliquos magis calefacere in perigæis suis, propter propinquitatem ad terram, quam in apogæis. Quod si eveniat ut in aliqua regione sol sit simul in perigæo et propius ad perpendiculum, necesse est ut magis calefaciat quam in regione ubi sol sit similiter in perigæo sed magis ad obliquum. Adeo ut comparatio exaltationis planetarum notari debeat, prout ex perpendiculo aut obliquitate participet, secundum regionum varietatem.

18. Sol etiam, et similiter reliqui planetæ, calefacere magis existimantur cum sint in proximo ad stellas fixas majores; veluti cum sol ponitur in Leone, magis vicinus fit Cordi Leonis, Caudæ Leonis, et Spicæ Virginis, et Sirio, et Caniculæ, quam cum ponitur in Cancro, ubi tamen magis sistitur ad perpendiculum.[1] Atque credendum est partes cœli majorem infundere calorem (licet ad tactum minime perceptibilem) quo magis ornatæ sint stellis, præsertim majoribus.

19. Omnino calor cœlestium augetur tribus modis; videlicet ex perpendiculo, ex propinquitate sive perigæo, et ex conjunctione sive consortio stellarum.

20. Magnum omnino invenitur intervallum inter calorem animalium ac etiam radiorum cœlestium (prout ad nos deferuntur), atque flammam, licet lenissimam, atque etiam ignita omnia, atque insuper liquores, aut aërem ipsum majorem in modum ab igne calefactum. Etenim flamma spiritus vini, præsertim rara nec constipata, tamen potis est stramen aut linteum aut papyrum incendere; quod nunquam faciet calor animalis vel solis, absque speculis comburentibus.

21. Flammæ autem et ignitorum plurimi sunt gradus in fortitudine et debilitate caloris. Verum de his nulla est facta diligens inquisitio; ut necesse sit ista leviter transmittere. Videtur autem ex flammis illa ex spiritu vini esse mollissima; nisi forte ignis fatuus, aut flammæ seu coruscationes ex sudoribus animalium, sint molliores. Hanc sequi opinamur flammam ex vegetabilibus levibus et porosis, ut stramine, scirpis, et foliis arefactis, a quibus non multum differre flammam ex pilis aut

[1] This astrological fancy was probably suggested by a wish to explain why July is hotter than June. In the division of the Zodiac into trigons each of which corresponds to one of the elements, Leo forms one of the corners of the fiery trigon; and it is moreover the sun's proper sign.

plumis. Hanc sequitur fortasse flamma ex lignis, præsertim iis quæ non multum habent ex resina aut pice; ita tamen ut flamma ex lignis quæ parva sunt mole (quæ vulgo colligantur in fasciculos) lenior sit quam quæ fit ex truncis arborum et radicibus. Id quod vulgo experiri licet in fornacibus quæ ferrum excoquunt, in quibus ignis ex fasciculis et ramis arborum non est admodum utilis. Hanc sequitur (ut arbitramur) flamma ex oleo et sevo et cera, et hujusmodi oleosis et pinguibus, quæ sunt sine magna acrimonia. Fortissimus autem calor reperitur in pice et resina; atque adhuc magis in sulphure et caphura[1], et naphtha et petrelæo et salibus (postquam materia cruda eruperit), et in horum compositionibus, veluti pulvere tormentario, igne Græco (quem vulgo ignem ferum vocant), et diversis ejus generibus, quæ tam obstinatum habent calorem ut ab aquis non facile exstinguantur.

22. Existimamus etiam flammam quæ resultat ex nonnullis metallis imperfectis esse valde robustam et acrem. Verum de istis omnibus inquiratur ulterius.

23. Videtur autem flamma fulminum potentiorum has omnes flammas superare; adeo ut ferrum ipsum perfectum aliquando colliquaverit in guttas, quod flammæ illæ alteræ facere non possunt.

24. In ignitis autem diversi sunt etiam gradus caloris, de quibus etiam non facta est diligens inquisitio. Calorem maxime debilem existimamus esse ex linteo usto, quali ad flammæ excitationem uti solemus; et similiter ex ligno illo spongioso aut funiculis arefactis qui ad tormentorum accensionem adhibentur. Post hunc sequitur carbo ignitus ex lignis et anthracibus atque etiam ex lateribus ignitis, et similibus. Ignitorum autem vehementissime calida existimamus esse metalla ignita, ut ferrum et cuprum et cætera. Verum de his etiam facienda est ulterior inquisitio.

25. Inveniuntur ex ignitis nonnulla longe calidiora quam nonnullæ ex flammis. Multo enim calidius est et magis adurens ferrum ignitum quam flamma spiritus vini.

26. Inveniuntur etiam ex illis quæ ignita non sunt sed tantum ab igne calefacta, sicut aquæ ferventes et aër conclusus in reverberatoriis, nonnulla quæ superant calore multa ex flammis ipsis et ignitis.

[1] Camphor.

27. Motus auget calorem; ut videre est in follibus et flatu; adeo ut duriora ex metallis non solvantur aut liquefiant per ignem mortuum aut quietum, nisi flatu excitetur.

28. Fiat experimentum per specula comburentia, in quibus (ut memini)[1] hoc fit, ut si speculum ponatur (exempli gratia) ad distantiam spithamæ ab objecto combustibili, non tantopere incendat aut adurat quam si positum fuerit speculum (exempli gratia) ad distantiam semi-spithamæ, et gradatim et lente trahatur ad distantiam spithamæ. Conus tamen et unio radiorum eadem sunt, sed ipse motus auget operationem caloris.[2]

29. Existimantur incendia illa quæ fiunt flante vento forti majores progressus facere adversus ventum quam secundum ventum; quia scilicet flamma resilit motu perniciore, vento remittente, quam procedit vento impellente.

30. Flamma non emicat aut generatur, nisi detur aliquid concavi in quo flamma movere possit et ludere; præterquam in flammis flatuosis pulveris tormentarii, et similibus, ubi compressio et incarceratio flammæ auget ejus furorem.

31. Incus per malleum calefit admodum; adeo ut si incus fuerit laminæ tenuioris, existimemus illam per fortes et continuos ictus mallei posse rubescere, ut ferrum ignitum; sed de hoc fiat experimentum.

32. At in ignitis quæ sunt porosa, ita ut detur spatium ad exercendum motum ignis, si cohibeatur hujusmodi motus per compressionem fortem, statim extinguitur ignis; veluti cum linteum ustum aut filum ardens candelæ aut lampadis aut etiam carbo aut pruna ardens comprimitur per pressorium aut pedis conculcationem aut hujusmodi, statim cessant operationes ignis.

33. Approximatio ad corpus calidum auget calorem, pro gradu approximationis; quod etiam fit in lumine; nam quo propius collocatur objectum ad lumen eo magis est visibile.

34. Unio calorum diversorum auget calorem, nisi facta sit commistio corporum. Nam focus magnus et focus parvus in eodem loco nonnihil invicem augent calorem; at aqua tepida immissa in aquam ferventem refrigerat.

[1] Compare *De Calore et Frigore*:—"And the operation of them [burning-glasses] is, *as I remember*, first to place them," &c., which seems to prove, not only that Bacon had no burning-glass at hand, but also that he was not familiar with the use of them. —*J. S.*

[2] The only explanation of this is, that the focal length of the lens lay between a span and half a span.

35. Mora corporis calidi auget calorem. Etenim calor perpetuo transiens et emanans commiscetur cum calore præinexistente, adeo ut multiplicet calorem. Nam focus non æque calefacit cubiculum per moram semihoræ ac si idem focus duret per horam integram. At hoc non facit lumen; etenim lampas aut candela in aliquo loco posita non magis illuminat per moram diuturnam quam statim ab initio.

36. Irritatio per frigidum ambiens auget calorem; ut in focis videre est per gelu acre. Quod existimamus fieri non tantum per conclusionem et contractionem caloris, quæ est species unionis, sed per exasperationem; veluti cum aër aut baculum violenter comprimitur aut flectitur, non ad punctum loci prioris resilit, sed ulterius in contrarium. Itaque fiat diligens experimentum per baculum vel simile aliquid immissum in flammam, utrum ad latera flammæ non uratur citius quam in medio flammæ.

37. Gradus autem in susceptione caloris sunt complures. Atque primo omnium notandum est, quam parvus et exilis calor etiam ea corpora quæ caloris minime omnium sunt susceptiva immutet tamen et nonnihil calefaciat. Nam ipse calor manus globulum plumbi aut alicujus metalli paulisper detentum nonnihil calefacit. Adeo facile et in omnibus transmittitur et excitatur calor, corpore nullo modo ad apparentiam immutato.

38. Facillime omnium corporum apud nos et excipit et remittit calorem aër; quod optime cernitur in vitris calendaribus. Eorum confectio est talis[1]: accipiatur vitrum ventre concavo, collo tenui et oblongo; resupinetur et demittatur hujusmodi vitrum ore deorsum verso, ventre sursum, in aliud vasculum vitreum ubi sit aqua, tangendo fundum vasculi illius recipientis extremo ore vitri immissi, et incumbat paullulum vitri immissi collum ad os vitri recipientis, ita ut stare possit; quod ut commodius fiat, apponatur parum ceræ ad os vitri recipientis; ita tamen ut non penitus obturetur os ejus, ne ob defectum aëris succedentis impediatur motus de quo jam dicetur, qui est admodum facilis et delicatus.

Oportet autem ut vitrum demissum, antequam inseratur in alterum, calefiat ad ignem a parte superiori, ventre scilicet.

[1] I am very much inclined to think that Bacon heard of the vitrum calendare from Fludde, or à Fluctibus, as he is called in Latin, who returned from Italy in [1605], and in whose philosophy, built upon certain abstract notions of rarefaction and condensation, perpetual reference is made to the air-thermometer, to which he gives the same name.

Postquam autem fuerit vitrum illud collocatum ut diximus, recipiet et contrahet se aër (qui dilatatus erat per calefactionem), post moram sufficientem pro extinctione illius ascititii caloris, ad talem extensionem sive dimensionem qualis erit aëris ambientis aut communis tunc temporis quando immittitur vitrum, atque attrahet aquam in sursum ad hujusmodi mensuram. Debet autem appendi charta angusta et oblonga, et gradibus (quot libuerit) interstincta. Videbis autem, prout tempestas diei incalescit aut frigescit, aërem se contrahere in angustius per frigidum et extendere se in latius per calidum; id quod conspicietur per aquam ascendentem quando contrahitur aër, et descendentem sive depressum quando dilatatur aër. Sensus autem aëris, quatenus ad calidum et frigidum, tam subtilis est et exquisitus ut facultatem tactus humani multum superet; adeo ut solis radius aliquis, aut calor anhelitus, multo magis calor manus, super vitri summitatem positus, statim deprimat aquam manifesto.[1] Attamen existimamus spiritum animalium magis adhuc exquisitum sensum habere calidi et frigidi, nisi quod a mole corporea impediatur et hebetetur.

39. Post aërem, existimamus corpora esse maxime sensitiva caloris ea quæ a frigore recenter immutata sint et compressa, qualia sunt nix et glacies; ea enim leni aliquo tepore solvi incipiunt et colliquari. Post illa sequitur fortasse argentum vivum. Post illud sequuntur corpora pinguia, ut oleum, butyrum, et similia; deinde lignum; deinde aqua; postremo lapides

[1] In consequence of this description of the Vitrum Calendare, the invention of the Thermometer has been ascribed to Bacon; but without good reason. Fludd was the first to publish an account of the Thermometer; but Nelli says, and (admitting his authorities) truly, that Galileo's invention was anterior to any publication of Fludd's. Nelli speaks of a letter preserved in the library of his family "in copiâ," which Castelli addressed to Cesarina in 1638. Castelli says that, more than thirty-five years before, Galileo had shown him an experiment which he describes; namely, the rise of the water into an inverted tube with a bulb at one extremity, when the open end of the tube is put into a vessel of water, and goes on, "del quale effetto il medesimo Signor Galileo si era servito per fabbricare un Istromento da esaminare i gradi del caldo e del freddo." Thus far Castelli; but how long after the original experiment the instrument was made, does not appear from his statement. Nelli also refers to Viviani's Life of Galileo, wherein it is said that Galileo invented the Thermometer between 1593 and 1597. It has not, I think, been remarked that the rise of water under the circumstances of Galileo's original experiment had already been described in Porta's *Natural Magic;* though, as is usually the case with Porta, one cannot be sure whether he had ever actually seen it. "Possumus etiam solo calore aquam ascendere facere. Sit dolium supra turrim, vel ligneum, vel argillaceum aut æreum, quod melius erit, et canalem habeat in medio, qui descendat inferius usque ad aquam, et in eâ submersus sit, sed adglutinatus, ne respiret. Calefiat vas superius vel sole vel igne, nam aër, qui in alvo continetur, rarefit et foras prolabitur, unde aquam in bullas tumere videbimus, mox absentiâ solis ubi vas refrigescit, aër condensatur, et quum non sufficiat inclusus aër vacuum replere, accersitur aqua et ascendit supra." — *Porta's Magic*, book xix. chap. 4.

et metalla, quæ non facile calefiunt, præsertim interius. Illa tamen calorem semel susceptum diutissime retinent; ita ut later aut lapis aut ferrum ignitum in pelvim aquæ frigidæ immissum et demersum, per quartam partem horæ (plus minus) retineat calorem, ita ut tangi non possit.

40. Quo minor est corporis moles, eo citius per corpus calidum approximatum incalescit; id quod demonstrat omnem calorem apud nos esse corpori tangibili quodammodo adversum.

41. Calidum, quatenus ad sensum et tactum humanum, res varia est et respectiva; adeo ut aqua tepida, si manus frigore occupetur, sentiatur esse calida; sin manus incaluerit, frigida.

XIV.

Quam inopes simus historiæ quivis facile advertet, cum in tabulis superioribus, præterquam quod loco historiæ probatæ et instantiarum certarum nonnunquam traditiones et relationes inseramus (semper tamen adjecta dubiæ fidei et auctoritatis nota), sæpenumero etiam hisce verbis, *fiat experimentum*, vel *inquiratur ulterius*, uti cogamur.

XV.

Atque opus et officium harum trium tabularum, Comparentiam Instantiarum ad Intellectum vocare consuevimus. Facta autem Comparentia, in opere ponenda est ipsa Inductio. Invenienda est enim super Comparentiam omnium et singularum Instantiarum natura talis, quæ cum natura data perpetuo adsit, absit, atque crescat et decrescat; sitque (ut superius dictum est) limitatio naturæ magis communis.[1] Hoc si mens jam ab initio facere tentet affirmative (quod sibi permissa semper facere solet), occurrent phantasmata et opinabilia et notionalia male terminata et axiomata quotidie emendanda; nisi libeat (scholarum more) pugnare pro falsis. Ea tamen proculdubio erunt meliora aut praviora pro facultate et robore intellectus qui operatur. At omnino Deo (Formarum inditori et opifici) aut fortasse angelis et intelligentiis competit Formas per affirmationem immediate nosse, atque ab initio contemplationis.[2] Sed certe supra hominem est; cui tantum conceditur,

[1] That is, a particular case of a more general nature. The force of the last clause may be thus illustrated: If all bodies were more or less luminous accordingly as they were more or less hot, the luminous and the hot would be concomitantia, but neither would be the form of the other. [See General Preface, § 8.—*J. S.*]

[2] It was, I apprehend, the received doctrine, that whatever knowledge the angelic nature is capable of it attains at once. Thus it is said, "Inferiores substantiæ intellectivæ, scilicet animæ humanæ, habent potentiam intellectivam non completam naturaliter,

procedere primo per Negativas, et postremo loco desinere in Affirmativas, post omnimodam exclusionem.

XVI.

Itaque naturæ facienda est prorsus solutio et separatio, non per ignem certe, sed per mentem, tanquam ignem divinum. Est itaque Inductionis veræ opus primum (quatenus ad invenicndas Formas) Rejectio sive Exclusiva naturarum singularum quæ non inveniuntur in aliqua instantia ubi natura data adest, aut inveniuntur in aliqua instantia ubi natura data abest, aut inveniuntur in aliqua instantia crescere cum natura data decrescat, aut decrescere cum natura data crescat. Tum vero post Rejectionem et Exclusivam debitis modis factam, secundo loco (tanquam in fundo) manebit (abeuntibus in fumum opinionibus volatilibus) Forma affirmativa, solida et vera et bene terminata. Atque hoc breve dictu est, sed per multas ambages ad hoc pervenitur. Nos autem nihil fortasse ex iis quæ ad hoc faciunt prætermittemus.

XVII.

Cavendum autem est et monendum quasi perpetuo, ne, cum tantæ partes Formis videantur a nobis tribui, trahantur ea quæ dicimus ad Formas eas quibus hominum contemplationes et cogitationes hactenus assueverunt.

Primo enim, de Formis copulatis, quæ sunt (ut diximus) naturarum simplicium conjugia ex cursu communi universi, ut leonis, aquilæ, rosæ, auri, et hujusmodi, impræsentiarum non loquimur.[1] Tempus enim erit de iis tractandi, cum ventum fuerit ad Latentes Processus et Latentes Schematismos, eorumque inventionem, prout reperiuntur in substantiis (quas vocant) seu naturis concretis.

Rursus vero, non intelligantur ea quæ dicimus (etiam quatenus ad naturas simplices) de Formis et ideis abstractis, aut in materia non determinatis aut male determinatis. Nos enim quum de Formis loquimur, nil aliud intelligimus quam leges

sed completur in iis successivè per hoc quod accipiunt species a rebus. Potentia vero intellectiva in substantiis spiritualibus superioribus, id est in angelis, completa est per species intelligibiles connaturales: in quantum habent species intelligibiles connaturales ad omnia intelligenda quæ naturaliter cognoscere possunt." — *S. Thomas, Summa Theol.* 1ma, q. 45. a 2.

[1] Bacon's principle that the form of any substance may be conceived as a combination of the forms which correspond to each of its qualities is well illustrated by the phrase "formæ copulatæ." The "forma copulata" is the "lex ex quâ corpus individuum edit actus puros." Of this law each section or paragraphus is the "forma alicujus ex naturis simplicibus quæ in eo corpore conjunguntur." I have already remarked on Mr. Wood's rendering of the word "paragraphus" in § 2.

illas et determinationes actus puri, quæ naturam aliquam simplicem ordinant et constituunt; ut calorem, lumen, pondus; in omnimoda materia et subjecto susceptibili. Itaque eadem res est Forma Calidi aut Forma Luminis, et Lex Calidi sive Lex Luminis; neque vero a rebus ipsis et parte operativa unquam nos abstrahimus aut recedimus. Quare cum dicimus (exempli gratia) in inquisitione Formæ Caloris, *rejice tenuitatem*, aut *tenuitas non est ex Forma Caloris*, idem est ac si dicamus *potest homo superinducere calorem in corpus densum*; aut contra, *potest homo auferre aut arcere calorem a corpore tenui.*

Quod si cuiquam videantur etiam Formæ nostræ habere nonnihil abstracti, quod misceant et conjungant heterogenea (videntur enim valde esse heterogenea calor cœlestium et ignis; rubor fixus in rosa aut similibus, et apparens in iride aut radiis opalii aut adamantis; mors ex summersione, ex crematione, ex punctura gladii, ex apoplexia, ex atrophia; et tamen conveniunt ista in natura calidi, ruboris, mortis), is se habere intellectum norit consuetudine et integralitate rerum et opinionibus captum et detentum.[1] Certissimum enim est ista, utcunque heterogenea et aliena, coire in Formam sive Legem eam quæ ordinat calorem aut ruborem aut mortem; nec emancipari posse potentiam humanam et liberari a naturæ cursu communi, et expandi et exaltari ad efficientia nova et modos operandi novos, nisi per revelationem et inventionem hujusmodi Formarum; et tamen post istam unionem naturæ, quæ est res maxime principalis, de naturæ divisionibus et venis, tam ordinariis quam interioribus et verioribus, suo loco postea dicetur.

XVIII.

Jam vero proponendum est exemplum Exclusionis sive Rejectionis naturarum, quæ per Tabulas Comparentiæ reperiuntur non esse ex Forma Calidi; illud interim monendo, non solum sufficere singulas tabulas ad Rejectionem alicujus naturæ, sed

[1] The objection here anticipated has actually been made. It has been said that we cannot be sure that any quality always proceeds from the same cause. And in truth, though the axiom "like causes produce like effects," and vice versâ, seems to be inseparable from the idea of causation, yet the force of the objection remains. For the reference of sensible qualities to outward objects involves a subjective element. The same colour, as referred to a substance as the object in which it resides, is a different thing as it is a fixed colour, or prismatic, or epipolar, &c. They agree, it may be said, in the type of undulation; but viewed as properties of bodies, or with reference to operations on them, they are distinct. And if we could go further into the mechanism of sensation, we should probably recede further both from concrete bodies and from practice.

etiam unamquamque ex instantiis singularibus in illis contentis. Manifestum enim est ex iis quæ dicta sunt, omnem instantiam contradictoriam destruere opinabile de Forma. Sed nihilominus quandoque, perspicuitatis causa et ut usus tabularum clarius demonstretur, Exclusivam duplicamus aut repetimus.

Exemplum *Exclusivæ*, sive *Rejectionis Naturarum* a Forma Calidi.

1. Per radios solis, *rejice* naturam elementarem.[1]

2. Per ignem communem, et maxime per ignes subterraneos (qui remotissimi sunt et plurimum intercluduntur a radiis cœlestibus), *rejice* naturam cœlestem.

3. Per calefactionem omnigenum corporum (hoc est, mineralium, vegetabilium, partium exteriorum animalium, aquæ, olei, aëris, et reliquorum) ex approximatione sola ad ignem aut aliud corpus calidum, *rejice* omnem varietatem sive subtiliorem texturam corporum.

4. Per ferrum et metalla ignita, quæ calefaciunt alia corpora nec tamen omnino pondere aut substantia minuuntur, *rejice* inditionem sive mixturam substantiæ alterius calidi.

5. Per aquam ferventem atque aërem, atque etiam per metalla et alia solida calefacta, sed non usque ad ignitionem sive ruborem, *rejice* lucem aut lumen.

6. Per radios lunæ et aliarum stellarum (excepto sole), *rejice* etiam lucem et lumen.

7. Per Comparativam ferri igniti et flammæ spiritus vini (ex quibus ferrum ignitum plus habet calidi et minus lucidi, flamma autem spiritus vini plus lucidi et minus calidi), *rejice* etiam lucem et lumen.

8. Per aurum et alia metalla ignita, quæ densissimi sunt corporis secundum totum, *rejice* tenuitatem.

9. Per aërem, qui invenitur ut plurimum frigidus et tamen manet tenuis, *rejice* etiam tenuitatem.

10. Per ferrum ignitum, quod non intumescit mole sed manet intra eandem dimensionem visibilem, *rejice* motum localem aut expansivum secundum totum.

11. Per dilatationem aëris in vitris calendariis et similibus,

[1] This refers to the antithesis, almost fundamental in Peripatetic physics, of the celestial and the elementary. Heat, since the sun's rays are hot, cannot depend on the elemental as contradistinguished from the celestial nature.

qui movetur localiter et expansive manifesto neque tamen colligit manifestum augmentum caloris, *rejice* etiam motum localem aut expansivum secundum totum.

12. Per facilem tepefactionem omnium corporum, absque aliqua destructione aut alteratione notabili, *rejice* naturam destructivam aut inditionem violentam alicujus naturæ novæ.

13. Per consensum et conformitatem operum similium quæ eduntur a calore et a frigore, *rejice* motum tam expansivum quam contractivum secundum totum.

14. Per accensionem caloris ex attritione corporum, *rejice* naturam principialem. Naturam principialem vocamus eam quæ positiva reperitur in natura, nec causatur a natura præcedente.[1]

Sunt et aliæ naturæ: neque enim Tabulas conficimus perfectas, sed exempla tantum.

Omnes et singulæ naturæ prædictæ non sunt ex Forma Calidi. Atque ab omnibus naturis prædictis liberatur homo in operatione super Calidum.

XIX.

Atque in Exclusiva jacta sunt fundamenta Inductionis veræ; quæ tamen non perficitur donec sistatur in Affirmativa. Neque vero ipsa Exclusiva ullo modo perfecta est, neque adeo esse potest sub initiis. Est enim Exclusiva (ut plane liquet) rejectio naturarum simplicium; quod si non habeamus adhuc bonas et veras notiones naturarum simplicium, quomodo rectificari potest Exclusiva? At nonnullæ ex supradictis (veluti notio naturæ elementaris, notio naturæ cœlestis, notio tenuitatis) sunt notiones vagæ, nec bene terminatæ. Itaque nos, qui nec ignari sumus nec obliti quantum opus aggrediamur (viz. ut faciamus

[1] Bacon here anticipates not merely the essential character of the most recent theory of heat, but also the kind of evidence by which it has been established. The proof that caloric does not exist, — in other words that heat is not the manifestation of a peculiar substance diffused through nature, — rests mainly on experiments of friction.

Mr. Joule and Professor Thomson ascribe the discovery of this proof chiefly to Sir Humphrey Davy (see Beddoes's *Contributions to Physical and Medical Knowledge*, p. 14.): but though Davy's experiments guard against sources of error of which Bacon takes no notice, the merit of having perceived the true significance of the production of heat by friction belongs of right to Bacon.

It is curious that in the essay in which he opposes the doctrine of caloric, Davy endeavours to introduce a new error of the same kind, and to show that light really is a natura principialis, a peculiar substance which in combination with oxygen properly so called constitutes oxygen gas, which he accordingly calls phosoxygen.

intellectum humanum rebus et naturæ parem), nullo modo acquiescimus in his quæ adhuc præcepimus; sed et rem in ulterius provehimus, et fortiora auxilia in usum intellectus machinamur et ministramus, quæ nunc subjungemus. Et certe in Interpretatione Naturæ animus omnino taliter est præparandus et formandus, ut et sustineat se in gradibus debitis certitudinis, et tamen cogitet (præsertim sub initiis) ea quæ adsunt multum pendere ex iis quæ supersunt.

XX.

Attamen quia citius emergit veritas ex errore quam ex confusione, utile putamus ut fiat permissio intellectui, post tres tabulas Comparentiæ Primæ (quales posuimus) factas et pensitatas, accingendi se et tentandi opus Interpretationis Naturæ in affirmativa; tam ex instantiis tabularum, quam ex iis quæ alias occurrent. Quod genus tentamenti, *Permissionem Intellectus* sive *Interpretationem Inchoatam*, sive *Vindemiationem Primam* appellare consuevimus.

Vindemiatio Prima de Forma Calidi.

Animadvertendum autem est, Formam rei inesse (ut ex iis quæ dicta sunt plane liquet) instantiis universis et singulis in quibus res ipsa inest; aliter enim Forma non esset; itaque nulla plane dari potest instantia contradictoria. Attamen longe magis conspicua invenitur Forma et evidens in aliquibus instantiis quam in aliis; in iis videlicet, ubi minus cohibita est natura Formæ et impedita et redacta in ordinem per naturas alias. Hujusmodi autem instantias, *Elucescentias* vel *Instantias Ostensivas* appellare consuevimus. Pergendum itaque est ad Vindemiationem ipsam Primam de Forma Calidi.

Per universas et singulas instantias, natura cujus limitatio est Calor[1] videtur esse Motus. Hoc autem maxime ostenditur in flamma, quæ perpetuo movetur; et in liquoribus ferventibus aut bullientibus, qui etiam perpetuo moventur. Atque ostenditur etiam in incitatione sive incremento caloris facto per motum; ut in follibus, et ventis; de quo vide Instant. 29. Tab. 3. Atque similiter in aliis modis motus, de quibus vide Instant. 28. et 31. Tab. 3. Rursus ostenditur in extinctione ignis et caloris

[1] Of which heat is a particular case.

per omnem fortem compressionem, quæ frænat et cessare facit motum; de qua vide Instant. 30. et 32. Tab. 3. Ostenditur etiam in hoc, quod omne corpus destruitur aut saltem insigniter alteratur ab omni igne et calore forti ac vehemẽnti; unde liquido constat, fieri a calore tumultum et perturbationem et motum acrem in partibus internis corporis, qui sensim vergit ad dissolutionem.

Intelligatur hoc quod diximus de Motu (nempe, ut sit instar generis ad Calorem[1]), non quod calor generet motum, aut quod motus generet calorem (licet et hæc in aliquibus vera sint); sed quod ipsissimus Calor, sive *quid ipsum* Caloris, sit Motus et nihil aliud; limitatus tamen per differentias quas mox subjungemus, postquam nonnullas cautiones adjecerimus ad evitandum æquivocum.

Calidum ad sensum res respectiva est, et in ordine ad hominem non ad universum; et ponitur recte ut effectus Caloris tantum in spiritum animalem. Quin etiam in seipso res varia est, cum idem corpus (prout sensus prædisponitur) inducat perceptionem tam calidi quam frigidi; ut patet per Instant. 41. Tab. 3.

Neque vero communicatio Caloris, sive natura ejus transitiva per quam corpus admotum corpori calido incalescit, confundi debet cum Forma Calidi. Aliud enim est Calidum, aliud Calefactivum. Nam per motum attritionis inducitur calor absque aliquo calido præcedente, unde excluditur Calefactivum a Forma Calidi. Atque etiam ubi calidum efficitur per approximationem calidi, hoc ipsum non fit ex Forma Calidi; sed omnino pendet a natura altiore et magis communi; viz. ex natura assimilationis sive multiplicationis sui; de qua facienda est separatim inquisitio.

At notio ignis plebeia est, et nihil valet; composita enim est ex concursu qui fit calidi et lucidi in aliquo corpore; ut in flamma communi, et corporibus accensis usque ad ruborem.

Remoto itaque omni æquivoco, veniendum jam tandem est ad Differentias veras quæ limitant Motum, et constituunt eum in Formam Calidi.

Prima igitur Differentia ea est; quod Calor sit motus Expansivus, per quem corpus nititur ad dilatationem sui, et recipiendi se in majorem sphæram sive dimensionem quam prius occupaverat. Hæc autem Differentia maxime osten-

[1] i. e. that it is as the genus of which heat is a species.

ditur in flamma; ubi fumus sive halitus pinguis manifesto dilatatur et aperit se in flammam.

Ostenditur etiam in omni liquore fervente, qui manifesto intumescit, insurgit, et emittit bullas; atque urget processum expandendi se, donec vertatur in corpus longe magis extensum et dilatatum quam sit ipse liquor; viz. in vaporem aut fumum aut aërem.

Ostenditur etiam in omni ligno et combustibili; ubi fit aliquando exudatio, at semper evaporatio.

Ostenditur etiam in colliquatione metallorum, quæ (cum sint corporis compactissimi) non facile intumescunt et se dilatant; sed tamen spiritus eorum, postquam fuerit in se dilatatus, et majorem adeo dilatationem concupierit, trudit plane et agit partes crassiores in liquidum. Quod si etiam calor fortius intendatur, solvit et vertit multum ex iis in volatile.

Ostenditur etiam in ferro aut lapidibus; quæ licet non liquefiant aut fundantur, tamen emolliuntur. Quod etiam fit in baculis ligni; quæ calefacta paullulum in cineribus calidis fiunt flexibilia.

Optime autem cernitur iste motus in aëre, qui per exiguum calorem se dilatat continuo et manifesto; ut per Instant. 38. Tab. 3

Ostenditur etiam in natura contraria Frigidi. Frigus enim omne corpus contrahit et cogit in angustius; adeo ut per intensa frigora clavi excidant ex parietibus, æra dissiliant, vitrum etiam calefactum et subito positum in frigido dissiliat et frangatur. Similiter aër per levem infrigidationem recipit se in angustius; ut per Instant. 38. Tab. 3. Verum de his fusius dicetur in inquisitione de Frigido.

Neque mirum est si Calidum et Frigidum edant complures actiones communes (de quo vide Instant. 32. Tab. 2.), cum inveniantur duæ ex sequentibus Differentiis (de quibus mox dicemus) quæ competunt utrique naturæ; licet in hac Differentia (de qua nunc loquimur) actiones sint ex diametro oppositæ. Calidum enim dat motum expansivum et dilatantem, Frigidum autem dat motum contractivum et coëuntem.

Secunda Differentia est modificatio prioris; hæc videlicet, quod Calor sit motus expansivus sive versus circum-

ferentiam; hac lege tamen, ut una feratur corpus sursum. Dubium enim non est quin sint motus complures mixti. Exempli gratia; sagitta aut spiculum simul et progrediendo rotat, et rotando progreditur. Similiter et motus Caloris simul est et expansivus et latio in sursum.

Hæc vero Differentia ostenditur in forcipe, aut bacillo ferreo immisso in ignem; quia si immittatur perpendiculariter tenendo manum superius, cito manum adurit; sin ex latere aut inferius, omnino tardius.

Conspicua etiam est in distillationibus per descensorium; quibus utuntur homines ad flores delicatiores, quorum odores facile evanescunt. Nam hoc reperit industria, ut collocent ignem non subter sed supra, ut adurat minus. Neque enim flamma tantum vergit sursum, sed etiam omne calidum.[1]

Fiat autem experimentum hujus rei in contraria natura Frigidi: viz. utrum frigus non contrahat corpus descendendo deorsum, quemadmodum calidum dilatat corpus ascendendo sursum. Itaque adhibeantur duo bacilla ferrea, vel duo tubi vitrei, quoad cætera pares, et calefiant nonnihil; et ponatur spongia cum aqua frigida, vel nix, subter unam, et similiter super alteram. Existimamus enim celeriorem fore refrigerationem ad extremitates in eo bacillo ubi nix ponitur supra quam in eo ubi nix ponitur subter; contra ac fit in calido.

Tertia Differentia ea est; ut Calor sit motus, non expansivus uniformiter secundum totum, sed expansivus per particulas minores corporis; et simul cohibitus et repulsus et reverberatus, adeo ut induat motum alternativum et perpetuo trepidantem et tentantem et nitentem et ex repercussione irritatum; unde furor ille ignis et caloris ortum habet.

Ista vero Differentia ostenditur maxime in flamma et liquoribus bullientibus; quæ perpetuo trepidant, et in parvis portionibus tument, et rursus subsidunt.

Ostenditur etiam in iis corporibus quæ sunt tam duræ compagis ut calefacta aut ignita non intumescant aut dilatentur mole; ut ferrum ignitum, in quo calor est acerrimus.

[1] This is an instance to show that heat does not descend so rapidly as it ascends through liquids, which is true.

Ostenditur etiam in hoc, quod per frigidissimas tempestates focus ardeat acerrime.

Ostenditur etiam in hoc, quod cum extenditur aër in vitro calendari absque impedimento aut repulsione, uniformiter scilicet et æqualiter, non percipiatur calor. Etiam in ventis conclusis, licet erumpant vi maxima, tamen non percipitur calor insignis; quia scilicet motus fit secundum totum, absque motu alternante in particulis. Atque ad hoc fiat experimentum, utrum flamma non urat acrius versus latera quam in medio flammæ.

Ostenditur etiam in hoc, quod omnis ustio transigatur per minutos poros corporis quod uritur; adeo ut ustio subruat et penetret et fodicet et stimulet, perinde ac si essent infinitæ cuspides acus. Itaque ex hoc illud etiam fit, quod omnes aquæ fortes (si proportionatæ sint ad corpus in quod agunt) edant opera ignis, ex natura sua corrodente et pungente.

Atque ista Differentia (de qua nunc dicimus) communis est cum natura frigidi; in quo cohibetur motus contractivus per renitentiam expandendi; quemadmodum in calido cohibetur motus expansivus per renitentiam contrahendi.

Itaque sive partes corporis penetrent versus interius sive penetrent versus exterius, similis est ratio; licet impar admodum sit fortitudo; quia non habemus hic apud nos in superficie terræ aliquid quod sit impense frigidum. Vide Instant 27. Tab. 9.

Quarta Differentia est modificatio prioris: hæc scilicet, quod motus ille stimulationis aut penetrationis debeat esse nonnihil rapidus et minime lentus; atque fiat etiam per particulas, licet minutas; tamen non ad extremam subtilitatem, sed quasi majusculas.

Ostenditur hæc Differentia in comparatione operum quæ edit ignis cum iis quæ edit tempus sive ætas. Ætas enim sive tempus arefacit, consumit, subruit, et incinerat, non minus quam ignis; vel potius longe subtilius; sed quia motus ejusmodi est lentus admodum et per particulas valde exiles, non percipitur calor.

Ostenditur etiam in comparatione dissolutionum ferri et auri. Aurum enim dissolvitur absque calore excitato; ferrum autem cum vehementi excitatione caloris, licet

simili fere intervallo quoad tempus. Quia scilicet in auro, ingressus aquæ separationis est clemens et subtiliter insinuans, et cessio partium auri facilis; at in ferro, ingressus est asper et cum conflictu, et partes ferri habent obstinationem majorem.

Ostenditur etiam aliquatenus in gangrænis nonnullis et mortificationibus carnium; quæ non excitant magnum calorem aut dolorem, ob subtilitatem putrefactionis.

Atque hæc sit *Prima Vindemiatio*, sive *Interpretatio inchoata* de Forma Calidi, facta per *Permissionem Intellectus*.

Ex Vindemiatione autem ista Prima, Forma sive definitio vera Caloris (ejus qui est in ordine ad universum, non relativus tantummodo ad sensum) talis est, brevi verborum complexu: *Calor est motus expansivus, cohibitus, et nitens per partes minores.* Modificatur autem expansio; *ut expandendo in ambitum, nonnihil tamen inclinet versus superiora.* Modificatur autem et nixus ille per partes; *ut non sit omnino segnis, sed incitatus et cum impetu nonnullo.*[1]

[1] The Inquisitio de formâ calidi suggests these remarks:—

1st. A great part of it conduces in no way to the result. This may be said to be the natural consequence of the method of inquiry.

2nd. Heat (caloric) is confounded with the effects of chemical agencies, which are said "exequi opera caloris."

3rd. A greater source of confusion is the complete absence of any recognition of the principle that all bodies tend to acquire the temperature of those about them, and that the difference ad tactum which makes one body feel hotter or colder than another depends not on its being hotter or colder, but on the different degree of facility which they have in communicating their own respective temperature. In consequence of this, it had always been taught that one class of bodies were in their own nature cold, another hot, and so on. All liquids were cold. Experiments with a thermometer would have shown that they were not; but these Bacon did not try,—an instance among others how far he was from rejecting all he had been taught.

Of which remarks we may observe that, of the "Instantiæ convenientes," 13. is an instance of the third, while from 22. to the end exemplify the second; — of the "Instantiæ in proximo," 14—19. are to be referred to the third; from 27. to the end, to the second.

4th. Calidum and Frigidum seem to be considered distinct and not correlative qualities.

5th. The adoption of astrological fables about the hot and cold influence of the stars and planets [is to be remarked in the *Tabula Graduum*, 15. et seqq.]

Then comes the result, that the natura calidi is a motus expansivus. This is seen [in air], "Optime cernitur in aëre qui per exiguum calorem se dilatat continuo et manifesto, ut per Inst. 38. Tab. 3.:" that is, by the instance of a vitrum calendare, or air-thermometer. And this is beyond question a good instance. But then in the "exemplum exclusivæ," § 11., we read "Per dilatationem aëris in vitris calendariis et similibus, qui movetur localiter et expansive manifesto, neque tamen colligit manifestum augmentum caloris, rejice etiam motum localem aut expansivum secundum totum." How is this passage to be reconciled with the preceding? For if the example of the vitrum calendare proves anything, it proves a motus expansivus secundum totum; and if, on account of our having no manifest evidence that the air waxes hot when it expands, the example does not prove this, why is it adduced? The

Quod vero ad Operativam attinet, eadem res est. Nam designatio est talis; *Si in aliquo corpore naturali poteris excitare motum ad se dilatandum aut expandendum; eumque motum ita reprimere et in se vertere, ut dilatatio illa non procedat æqualiter, sed partim obtineat, partim retrudatur; proculdubio generabis Calidum:* non habita ratione, sive corpus illud sit elementare (ut loquuntur) sive imbutum a cœlestibus[1]; sive luminosum sive opacum; sive tenue sive densum; sive localiter expansum sive intra claustra dimensionis primæ contentum; sive vergens ad dissolutionem sive manens in statu; sive animal, sive vegetabile, sive minerale, sive aqua, sive oleum, sive aër, aut aliqua alia substantia quæcunque susceptiva motus

source of this confusion I believe to be that, though Bacon saw reason to affirm expansion to be the essence of the hot, yet he was perplexed by examples of two kinds: (α) bodies which do not visibly expand when they are heated, e. g. red-hot iron; (β) bodies which expand without becoming heated, e. g. compressed air when relieved from pressure. For the first difficulty, it might have occurred to him that the hot iron does expand, though not enough to be perceived (except by accurate measurement) to do so; and if he had followed the indication thus given, he might have been the discoverer of a general and most important law. The difficulty which the second class of phenomena creates ought to have prevented Bacon from assigning expansion as the forma calidi, — as being that which must always make a body hot, and without which it could not become so. For it would be too liberal an interpretation to say that the expressions "motus cohibitus et refrænatus," whereby the idea of expansion is qualified, refer to a condition essential in the case of elastic fluids, — namely that the expansion in becoming heated is due to an increased elasticity, and not to any decrease of external pressure. Even had the modification required by this class of cases been introduced, there still remains that of liquids whose temperature is below that of maximum density, which is altogether intractable. Of this phenomenon, however, it would be unreasonable to expect Bacon to have known anything. But setting it aside, if it were affirmed that Bacon, after having had a glimpse of the truth suggested by some obvious phenomena, had then recourse, as he himself expresses it, to certain "differentiæ inanes" in order to save the phenomena, I think it would be hard to dispute the truth of this censure.

Nevertheless, of the matters contained in the investigation, there are several of considerable interest, though, as has been said, they are not connected with the final result.

The relation between heat and mechanical action has recently become the subject of some very remarkable speculations, derived from the views suggested by S. Carnot in his *Reflections sur la Puissance Motrice du Feu*. Two views have been propounded. In one (that of S. Carnot himself), mechanical action is regarded as convertible with the transference from body to body of caloric. The other rejects the notion of caloric (the substance of heat) altogether. On this view mechanical action is convertible with the generation of heat; i. e. the raising of a given quantity of a given body from one given temperature to another. Both make use of the axiom "ex nihilo nihil;" and the conclusions thus obtained, especially in the second way of considering the subject, which I cannot doubt is the true one, are most remarkable, and the more interesting because they are, so to speak, the interpretation of a maxim whose truth is admitted à priori.

[1] That is, whether the body derive its properties from the primary qualities of the elements, or be imbued with specific or virtual qualities through the influence of the heavenly bodies. Thus St. Thomas says: "Sicut enim virtus calefaciendi et infrigidandi est in igne et aquâ consequens proprias eorum formas, et virtus, &c., actio intellectualis in homine consequens animam rationalem, ita omnes virtutes et actiones mediorum corporum transcendentes virtutes elementorum consequuntur eorum proprias formas, et reducuntur sicut in altiora principia in virtutes corporum cœlestium, et adhuc altius in substantias separatas." — *De occultis Operibus Naturæ.*

prædicti. Calidum autem ad sensum res eadem est; sed cum analogia, qualis competit sensui.[1] Nunc vero ad ulteriora auxilia procedendum est.

XXI.

Post Tabulas Comparentiæ Primæ et Rejectionem sive Exclusivam, nec non Vindemiationem Primam factam secundum eas, pergendum est ad reliqua auxilia intellectus circa Interpretationem Naturæ et Inductionem veram ac perfectam. In quibus proponendis, ubi opus erit tabulis, procedemus super Calidum et Frigidum; ubi autem opus erit tantum exemplis paucioribus, procedemus per alia omnia; ut nec confundatur inquisitio, et tamen doctrina versetur minus in angusto.

Dicemus itaque primo loco, de *Prærogativis Instantiarum*[2]: secundo, de *Adminiculis Inductionis:* tertio, de *Rectificatione Inductionis:* quarto, de *Variatione Inquisitionis pro Natura Subjecti*[3]*:* quinto, de *Prærogativis Naturarum* quatenus ad inquisitionem, sive de eo quod inquirendum est prius et posterius: sexto, de *Terminis Inquisitionis,* sive de synopsi omnium naturarum in universo: septimo, de *Deductione ad Praxin,* sive de eo quod est in ordine ad Hominem: octavo, de *Parascevis ad Inquisitionem:* postremo autem, de *Scala Ascensoria et Descensoria Axiomatum.*

XXII.

Inter Prærogativas Instantiarum, primo proponemus *Instantias Solitarias.* Eæ autem sunt Solitariæ, quæ exhibent naturam de qua fit inquisitio in talibus subjectis quæ nil habent commune cum aliis subjectis, præter illam ipsam naturam; aut rursus quæ non exhibent naturam de qua fit inquisitio in talibus subjectis quæ sunt similia per omnia cum aliis subjectis, præterquam in illa ipsa natura. Manifestum enim est quod hujusmodi instantiæ tollant ambages, atque accelerent et roborent Exclusivam; adeo ut paucæ ex illis sint instar multarum.

[1] The "analogia qualis competit sensui" is the "analogia hominis." This appears from the passages where the word occurs in the *Distributio Operis,* p. 138., and in § 40. of this book, near the end. Thus the meaning of the passage is that "calidum ad sensum" is the same as "calidum per se," only considered subjectively. The clause "sed cum analogiâ," &c., may be rendered—"but with that kind of reference to man as the percipient which belongs to the nature of a perception."

[2] Concerning the doctrine of Prærogative Instances, see *General Preface,* p. 43.—*J. S.*

[3] Compare the passage near the end of the last aphorism of this book—"Nunc vero ad adminicula et rectificationes inductionis, et *deinceps ad concreta* et latentes processus, et latentes schematismos, et cætera quæ aphorismo xxi. ordine proposuimus, pergendum;" and see *General Preface,* p. 32.—*J. S.*

Exempli gratia: si fiat inquisitio de natura Coloris, Instantiæ Solitariæ sunt prismata, gemmæ chrystallinæ, quæ reddunt colores non solum in se sed exterius supra parietem, item rores, etc. Istæ enim nil habent commune cum coloribus fixis in floribus, gemmis coloratis, metallis, lignis, etc., præter ipsum colorem. Unde facile colligitur, quod Color nil aliud sit quam modificatio imaginis lucis[1] immissæ et receptæ; in priore genere, per gradus diversos incidentiæ; in posteriore, per texturas et schematismos varios corporis. Istæ autem Instantiæ sunt Solitariæ quatenus ad similitudinem.

Rursus in eadem inquisitione, venæ distinctæ albi et nigri in marmoribus, et variegationes colorum in floribus ejusdem speciei, sunt Instantiæ Solitariæ. Album enim et nigrum marmoris, et maculæ albi et purpurei in floribus garyophylli[2], conveniunt fere in omnibus præter ipsum colorem. Unde facile colligitur, Colorem non multum rei habere cum naturis alicujus corporis intrinsecis, sed tantum situm esse in positura partium crassiori et quasi mechanica. Istæ autem Instantiæ sunt Solitariæ quatenus ad discrepantiam. Utrunque autem genus Instantias Solitarias appellare consuevimus; aut Ferinas[3], sumpto vocabulo ab astronomis.

XXIII.

Inter Prærogativas Instantiarum, ponemus secundo loco *Instantias Migrantes.* Eæ sunt, in quibus natura inquisita migrat ad generationem, cum prius non existeret; aut contra migrat ad corruptionem, cum prius existeret. Itaque in utraque antistrophe, instantiæ tales sunt semper geminæ; vel potius una instantia in motu sive transitu, producta ad periodum adversam. At hujusmodi instantiæ non solum accelerant et roborant Exclusivam, sed etiam compellunt Affirmativam sive Formam

[1] Reference is made to Telesius's system of vision. "Lux donata est facultate sese effundendi multiplicandique et aërem propriâ specie afficiendi, itaque et oculos subeundi." . . . Again, "lux quæ res quibus insunt [colores] permeat. . . ab ipsarum intingitur coloribus, et eas transvecta oculos subit."—*De Rerum Nat.* vii. 31. See also other passages of the same book. Bacon uses "imago" as equivalent to "species," the word used in the preceding quotation.

[2] Caryophyllea was a flower much cultivated in Holland in the sixteenth century; see Lemmius, *De Miraculis* (1581), p. 107. (The description seems more applicable to the tulip.) The flowers meant are pinks and carnations.

[3] I believe the word which Bacon here employs is at least very much less used than another of perhaps the same origin for which he has perhaps accidentally substituted it. "Feralis," we read in the *Lexicon Mathematicum* of Vitalis (1668), which appears to give a tolerably complete vocabulary of astrological words, "apud astronomos dicitur planeta, quando fuerit in loco ubi nullam cum reliquis familiaritatem habet: quod quidem maximum est detrimentum," &c.

ipsam in angustum. Necesse est enim ut Forma rei sit quippiam quod per hujusmodi Migrationem indatur, aut contra per hujusmodi Migrationem tollatur et destruatur. Atque licet omnis exclusio promoveat Affirmativam, tamen hoc magis directe fit in subjecto eodem quam in diversis. Forma autem (ut ex omnibus quæ dicta sunt manifesto liquet) prodens se in uno ducit ad omnia. Quo autem simplicior fuerit Migratio, eo magis habenda est instantia in pretio. Præterea Instantiæ Migrantes magni sunt usus ad partem operativam; quia cum proponant Formam copulatam cum Efficiente aut Privante, perspicue designant praxin in aliquibus; unde facilis etiam est transitus ad proxima. Subest tamen in illis nonnihil periculi, quod indiget cautione; hoc videlicet, ne Formam nimis retrahant ad Efficientem, et intellectum perfundant vel saltem perstringant falsa opinione de Forma ex intuitu Efficientis. Efficiens vero semper ponitur nil aliud esse quam vehiculum sive deferens Formæ.[1] Verum huic rei, per Exclusivam legitime factam, facile adhibetur remedium.

Proponendum itaque est jam exemplum Instantiæ Migrantis. Sit natura inquisita Candor sive Albedo: Instantia Migrans ad generationem est vitrum integrum et vitrum pulverizatum. Similiter, aqua simplex et aqua agitata in spumam. Vitrum enim integrum et aqua simplex diaphana sunt, non alba; at vitrum pulverizatum et aqua in spuma, alba, non diaphana. Itaque quærendum quid acciderit ex ista Migratione vitro aut aquæ. Manifestum enim est Formam Albedinis deferri et invehi per istam contusionem vitri et agitationem aquæ. Nihil autem reperitur accessisse, præter comminutionem partium vitri et aquæ, et aëris insertionem. Neque vero parum profectum est ad inveniendam Formam Albedinis, quod corpora duo per se diaphana, sed secundum magis et minus, (aër scilicet et aqua, aut aër et vitrum,) simul posita per minutas portiones exhibeant Albedinem, per refractionem inæqualem radiorum lucis.[2]

[1] The causa efficiens is the vehiculum formæ, inasmuch as it *carries the form* into the subject matter on which it acts; in other words it actuates the potential existence of the form in the subject matter. (Cf. *De Aug.* iii. 4)

[2] Bacon would perhaps have given as another illustration of what he has here said the beautiful whiteness of frosted silver, if he had been aware that it is in reality silver foam. It appears that when silver is in a state of fusion a very large quantity of oxygen is condensed on and within its surface, the whole of which escapes at the moment of solidification. This explanation of the appearance of granulated silver is due, I believe, to Gay Lussac.

Verum hac in re proponendum est etiam exemplum periculi et cautionis, de quibus diximus. Nimirum facile hic occurret intellectui ab hujusmodi Efficientibus depravato quod ad Formam Albedinis aër semper requiratur, aut quod Albedo generetur tantum per corpora diaphana; quæ omnino falsa sunt, et per multas Exclusiones convicta. Quin potius apparebit (misso aëre et hujusmodi) corpora omnino æqualia (secundum portiones opticas) dare diaphanum; corpora vero inæqualia per texturam simplicem, dare album; corpora inæqualia secundum texturam compositam, sed ordinatam, dare reliquos colores, præter nigrum; corpora vero inæqualia per texturam compositam, sed omnino inordinatam et confusam, dare nigrum.[1] Itaque de Instantia Migrante ad generationem in natura inquisita Albedinis, propositum est jam exemplum. Instantia autem Migrans ad corruptionem in eadem natura Albedinis, est spuma dissoluta, aut nix dissoluta. Exuit enim albedinem et induit diaphanum aqua, postquam fit integrale sine aëre.

Neque vero illud ullo modo prætermittendum est, quod sub Instantiis Migrantibus comprehendi debeant non tantum illæ quæ migrant ad generationem et privationem, sed etiam illæ quæ migrant ad majorationem et minorationem; cum illæ etiam tendant ad inveniendam Formam, ut per definitionem Formæ superius factam et Tabulam Graduum manifesto liquet. Itaque papyrus, quæ sicca cum fuerit alba est, at madefacta (excluso aëre et recepta aqua) minus alba est et magis vergit ad diaphanum, similem habet rationem cum instantiis supradictis.

XXIV.

Inter Prærogativas Instantiarum, tertio loco ponemus *Instantias Ostensivas*, de quibus in Vindemiatione Prima de Calido mentionem fecimus; quas etiam *Elucescentias*, sive *Instantias Liberatas et Prædominantes*, appellare consuevimus. Eæ sunt, quæ ostendunt naturam inquisitam nudam et substantivam, atque etiam in exaltatione sua aut summo gradu potentiæ suæ; emancipatam scilicet, et liberatam ab impedimentis, vel saltem per fortitudinem suæ virtutis dominantem super ipsa, eaque supprimentem et coercentem. Cum enim omne corpus suscipiat multas naturarum Formas copulatas et

[1] Compare *Valerius Terminus*, ch. xi.: — "It is then to be understood that absolute equality produceth transparence, inequality in simple order or proportion produceth whiteness, inequality in compound or respective order or proportion produceth other colours, and absolute or orderless inequality produceth blackness."—*J. S.*

in concreto, fit ut alia aliam retundat, deprimat, frangat, et liget; unde obscurantur Formæ singulæ. Inveniuntur autem subjecta nonnulla in quibus natura inquisita præ aliis est in suo vigore, vel per absentiam impedimenti vel per prædominantiam virtutis. Hujusmodi autem instantiæ sunt maxime ostensivæ Formæ. Verum et in his ipsis instantiis adhibenda est cautio, et cohibendus impetus intellectus. Quicquid enim ostentat Formam, eamque trudit, ut videatur occurrere intellectui, pro suspecto habendum est, et recurrendum ad Exclusivam severam et diligentem.

Exempli gratia; sit natura inquisita Calidum. Instantia Ostensiva motus expansionis, quæ (ut superius dictum est) portio est præcipua Formæ Calidi, est vitrum calendare aëris. Etenim flamma, licet manifesto exhibeat expansionem, tamen propter momentaneam extinctionem non ostendit progressum expansionis. Aqua autem fervens, propter facilem transitionem aquæ in vaporem et aërem, non tam bene ostendit expansionem aquæ in corpore suo. Rursus ferrum ignitum, et similia, tantum abest ut progressum ostendant, ut contra per retusionem et fractionem spiritus per partes compactas et crassas (quæ domant et frænant expansionem) ipsa expansio non sit omnino conspicua ad sensum. At vitrum calendare clare ostendit expansionem in aëre, et conspicuam et progredientem et durantem, neque transeuntem.

Rursus, exempli gratia; sit natura inquisita Pondus. Instantia Ostensiva ponderis, est argentum vivum. Omnia enim superat pondere magno intervallo, præter aurum; quod non multo gravius est.[1] At præstantior instantia est ad indicandam Formam Ponderis argentum vivum quam aurum; quia aurum solidum est et consistens, quod genus referri videtur ad densum; at argentum vivum liquidum est et turgens spiritu, et tamen multis partibus exuperat gravitate diamantem, et ea quæ putantur solidissima. Ex quo ostenditur Formam Gravis sive Ponderosi dominari simpliciter in copia materiæ, et non in arcta compage.

XXV.

Inter Prærogativas Instantiarum ponemus quarto loco *Instantias Clandestinas*, quas etiam *Instantias Crepusculi* appellare

[1] This mistake occurs also in the *Historia Densi et Rari*. According to Bacon, the density of mercury is to that of gold as thirty-nine is to forty, nearly; the real ratio being as little more than as seven to ten. The way in which his experiments were made accounts for a large part of this error. See the preface to the *Historia Densi et Rari*.

consuevimus. Eæ sunt veluti oppositæ Instantiis Ostensivis. Exhibent enim naturam inquisitam in infima virtute, et tanquam in incunabulis et rudimentis suis; tentantem et tanquam primo experientem, sed sub contraria natura latentem et subactam. Sunt autem hujusmodi instantiæ magni omnino momenti ad inveniendas Formas; quia sicut Ostensivæ ducunt facile ad differentias, ita Clandestinæ ducunt optime ad genera; id est, ad naturas illas communes quarum naturæ inquisitæ nihil aliud sunt quam limitationes.

Exempli gratia; sit natura inquisita Consistens, sive se determinans; cujus contrarium est Liquidum, sive fluens. Instantiæ Clandestinæ sunt illæ quæ exhibent gradum nonnullum debilem et infimum Consistentis in fluido; veluti bulla aquæ, quæ est tanquam pellicula quædam consistens et determinata, facta ex corpore aquæ. Similiter stillicidia, quæ, si adfuerit aqua quæ succedat, producunt se in filum admodum tenue, ne discontinuetur aqua; at si non detur talis copia aquæ quæ succedere possit, cadit aqua in guttis rotundis, quæ est figura quæ optime aquam sustinet contra discontinuationem. At in ipso temporis articulo cum desinit filum aquæ et incipit descensus in guttis, resilit ipsa aqua sursum ad evitandam discontinuationem. Quin in metallis, quæ cum funduntur sunt liquida sed magis tenacia, recipiunt se sæpe guttæ liquefactæ sursum, atque ita hærent. Simile quoddam est instantia speculorum puerilium, quæ solent facere pueruli in scirpis ex saliva, ubi cernitur etiam pellicula consistens aquæ. At multo melius se ostendit hoc ipsum in altero illo ludicro puerili, quando capiunt aquam, per saponem factam paulo tenaciorem, atque inflant eam per calamum cavum, atque inde formant aquam tanquam in castellum bullarum; quæ per interpositionem aëris inducit consistentiam eo usque ut se projici nonnihil patiatur absque discontinuatione.[1] Optime autem cernitur hoc in spuma et nive, quæ talem induunt consistentiam ut fere secari possint; cum tamen sint corpora formata ex aëre et aqua, quæ utraque sunt liquida. Quæ omnia non obscure innuunt Liquidum et Consistens esse notiones tantum plebeias, et ad sensum; inesse autem revera omnibus corporibus fugam et evitationem se discontinuandi; eam vero in corporibus homogeneis (qualia sunt

[1] Far tougher bubbles than the ordinary kind may be blown in water in which silk cocoons have been steeped. Some curious experiments on this subject are mentioned in Porter on *Silk Manufactures* (Lardner's Cyclop.).

liquida) esse debilem et infirmam, in corporibus vero quæ sunt composita ex heterogeneis, magis esse vividam et fortem; propterea quod admotio heterogenei constringit corpora, at subintratio homogenei solvit et relaxat.

Similiter, exempli gratia; sit natura inquisita Attractio, sive Coitio Corporum. Instantia circa Formam ejus Ostensiva maxime insignis est magnes. Contraria autem natura Attrahenti est non Attrahens, licet in substantia simili. Veluti ferrum, quod non attrahit ferrum, quemadmodum nec plumbum plumbum, nec lignum lignum, nec aquam aqua. Instantia autem Clandestina est magnes ferro armatus, vel potius ferrum in magnete armato. Nam ita fert natura, ut magnes armatus in distantia aliqua non trahat ferrum fortius quam magnes non armatus. Verum si admoveatur ferrum, ita ut tangat ferrum in magnete armato, tunc magnes armatus longe majus pondus ferri sustinet quam magnes simplex et inermis, propter similitudinem substantiæ ferri versus ferrum; quæ operatio erat omnino Clandestina et latens in ferro, antequam magnes accessisset.[1] Itaque manifestum est Formam Coitionis esse quippiam quod in magnete sit vividum et robustum, in ferro debile et latens. Itidem notatum est sagittas parvas ligneas absque cuspide ferrea, emissas ex sclopetis grandibus, altius penetrare in materiam ligneam (puta latera navium, aut similia), quam easdem sagittas ferro acuminatas, propter similitudinem substantiæ ligni ad lignum, licet hoc ante in ligno latuerit. Itidem, licet aër aërem aut aqua aquam manifesto non trahat in corporibus integris, tamen bulla approximata bullæ facilius dissolvit bullam quam si bulla illa altera abesset, ob appetitum Coitionis aquæ cum aqua et aëris cum aëre. Atque hujusmodi Instantiæ Clandestinæ (quæ sunt usus nobilissimi, ut dictum est) in portionibus corporum parvis et subtilibus maxime se dant conspiciendas. Quia massæ rerum majores sequuntur Formas magis catholicas et generales; ut suo loco dicetur.

XXVI.

Inter Prærogativas Instantiarum ponemus quinto loco *Instantias Constitutivas*, quas etiam *Manipulares* appellare consuevimus. Eæ sunt quæ constituunt unam speciem naturæ inquisitæ tanquam Formam Minorem. Cum enim Formæ

[1] This explanation of the effect of arming a magnet is wholly unsatisfactory. Before the *Novum Organum* was published, Galileo had shown that the armature acts by producing a more perfect contact. See the *Dialogi dei Sistemi massimi*, Giorn. 3ª. p. 440. I quote from the new edition. Firenze 1842.

legitimæ (quæ sunt semper convertibiles cum naturis inquisitis) lateant in profundo nec facile inveniantur, postulat res et infirmitas humani intellectus ut Formæ particulares, quæ sunt congregativæ *Manipulorum* quorundam instantiarum (neutiquam vero omnium) in notionem aliquam communem, non negligantur, verum diligentius notentur. Quicquid enim unit naturam, licet modis imperfectis, ad inventionem Formarum viam sternit. Itaque instantiæ quæ ad hoc utiles sunt non sunt contemnendæ potestatis, sed habent nonnullam Prærogativam.

Verum in his diligens est adhibenda cautio, ne intellectus humanus, postquam complures ex istis Formis particularibus adinvenerit atque inde partitiones sive divisiones naturæ inquisitæ confecerit, in illis omnino acquiescat, atque ad inventionem legitimam Formæ Magnæ se non accingat, sed præsupponat naturam velut a radicibus esse multiplicem et divisam, atque ulteriorem naturæ unionem, tanquam rem supervacuæ subtilitatis et vergentem ad merum abstractum, fastidiat et rejiciat.

Exempli gratia; sit natura inquisita Memoria, sive Excitans et Adjuvans memoriam. Instantiæ Constitutivæ sunt, ordo sive distributio, quæ manifesto juvat memoriam; item Loci in memoria artificiali, qui aut possunt esse loci secundum proprium sensum, veluti janua, angulus, fenestra, et similia, aut possunt esse personæ familiares et notæ, aut possunt esse quidvis ad placitum (modo in ordine certo ponantur), veluti animalia, herbæ; etiam verba, literæ, characteres, personæ historicæ, et cætera; licet nonnulla ex his magis apta sint et commoda, alia minus. Hujusmodi autem Loci memoriam insigniter juvant, eamque longe supra vires naturales exaltant. Item carmina facilius hærent et discuntur memoriter quam prosa. Atque ex isto Manipulo trium instantiarum, videlicet ordinis, locorum artificialis memoriæ, et versuum, constuitur species una auxilii ad Memoriam. Species autem illa *Abscissio Infiniti* recte vocari possit. Cum enim quis aliquid reminisci aut revocare in memoriam nititur, si nullam prænotionem habeat aut perceptionem ejus quod quærit, quærit certe et molitur et hac illac discurrit, tanquam in infinito. Quod si certam aliquam prænotionem habeat, statim abscinditur infinitum, et fit discursus memoriæ magis in vicino. In tribus autem illis instantiis quæ superius dictæ sunt, prænotio perspicua est et certa. In prima videlicet, debet esse aliquid quod congruat cum ordine;

in secunda debet esse imago quæ relationem aliquam habeat sive convenientiam ad illa loca certa; in tertia, debent esse verba quæ cadant in versum; atque ita abscinditur infinitum. Aliæ autem instantiæ dabunt hanc alteram speciem; ut quicquid deducat Intellectuale ad feriendum Sensum (quæ ratio etiam præcipue viget in artificiali memoria) juvet Memoriam. Aliæ instantiæ dabunt hanc alteram speciem; ut quæ faciunt impressionem in affectu forti, incutientia scilicet metum, admirationem, pudorem, delectationem, juvent Memoriam. Aliæ instantiæ dabunt hanc alteram speciem; ut quæ maxime imprimuntur a mente pura et minus præoccupata ante vel post, veluti quæ discuntur in pueritia aut quæ commentamur ante somnum, etiam primæ quæque rerum vices, magis hæreant in Memoria. Aliæ instantiæ dabunt hanc alteram speciem; ut multitudo circumstantiarum sive ansarum juvet Memoriam; veluti scriptio per partes non continuatas, lectio, sive recitatio voce alta. Aliæ denique instantiæ dabunt hanc alteram speciem; ut quæ expectantur et attentionem excitant melius hæreant quam quæ prætervolant. Itaque si scriptum aliquod vicies perlegeris, non tam facile illud memoriter disces quam si illud legas decies, tentando interim illud recitare, et ubi deficit memoria inspiciendo librum. Ita ut sint veluti sex Formæ Minores eorum quæ juvant Memoriam; videlicet abscissio infiniti; deductio intellectualis ad sensibile; impressio in affectu forti; impressio in mente pura; multitudo ansarum; præexpectatio.

Similiter, exempli gratia; sit natura inquisita Gustus, sive Gustatio. Instantiæ quæ sequuntur sunt Constitutivæ: videlicet, quod qui non olfaciunt sed sensu eo a natura destituti sunt, non percipiant aut gustu distinguant cibum rancidum aut putridum, neque similiter alliatum aut rosatum, aut hujusmodi. Rursus, illi qui per accidens nares habent per descensum rheumatis obstructas, non discernunt aut percipiunt aliquid putridum aut rancidum aut aqua rosacea inspersum. Rursus, qui afficiuntur hujusmodi rheumate, si in ipso momento cum aliquid fœtidum aut odoratum habent in ore sive palato emungant fortiter, in ipso instanti manifestam perceptionem habent rancidi vel odorati. Quæ instantiæ dabunt et constituent hanc speciem, vel partem potius, gustus; ut sensus gustationis ex parte nihil aliud sit quam olfactus interior, transiens et descendens a narium meatibus superioribus in os et palatum.

At contra, salsum et dulce et acre et acidum et austerum et amarum, et similia, hæc (inquam) omnia æque sentiunt illi in quibus olfactus deest aut obturatur, ac quisquam alius; ut manifestum sit sensum gustus esse compositum quiddam ex olfactu interiori et tactu quodam exquisito; de quo nunc non est dicendi locus.

Similiter, exempli gratia; sit natura inquisita Communicatio Qualitatis absque Commistione Substantiæ. Instantia Lucis dabit vel constituet unam speciem Communicationis; Calor vero et Magnes alteram. Communicatio enim lucis est tanquam momentanea, et statim perit, amota luce originali. At calidum et virtus magnetica, postquam tramissa fuerint vel potius excitata in alio corpore, hærent et manent ad tempus non parvum, amoto primo movente.

Denique magna est omnino Prærogativa Instantiarum Constitutivarum, ut quæ plurimum faciant et ad definitiones (præsertim particulares), et ad divisiones sive partitiones naturarum; de quo non male dixit Plato, *Quod habendus sit tanquam pro Deo, qui definire et dividere bene sciat.*[1]

XXVII.

Inter Prærogativas Instantiarum ponemus sexto loco *Instantias Conformes*, sive *Proportionatas;* quas etiam *Parallelas*, sive *Similitudines Physicas*, appellare consuevimus. Eæ vero sunt, quæ ostendunt similitudines et conjugationes rerum, non in Formis Minoribus (quod faciunt Instantiæ Constitutivæ) sed plane in concreto. Itaque sunt tanquam primi et infimi gradus ad unionem Naturæ. Neque constituunt aliquod axioma statim ab initio, sed indicant et observant tantum quendam consensum corporum. Attamen licet non multum promoveant ad inveniendas Formas, nihilominus magna cum utilitate revelant partium universi fabricam, et in membris ejus exercent veluti anatomiam quandam; atque proinde veluti manu-ducunt interdum ad axiomata sublimia et nobilia, præsertim illa quæ ad mundi configurationem pertinent, potius quam ad naturas et Formas simplices.

[1] Bacon perhaps refers to the passage in the *Philebus*, in which the resolution of articulate sounds into their elements is referred to εἴτε τις θεὸς εἴτε καὶ θεῖος ἄνθρωπος. Compare Jamblichus (apud Stobæum, § 81.): Θεὸς ἦν τις ὡς ἀληθῶς ὁ καταδείξας τὴν διαλεκτικὴν καὶ καταπέμψας τοῖς ἀνθρώποις. [Mr. Kitchen, in his edition of the *Novum Organum* (Oxford, 1855), which I did not see till this was in type, refers to the *Phædrus*, 266. a., — τούτων δὴ ἔγωγε αὐτός τε ἐραστὴς τῶν διαιρέσεων καὶ συναγωγῶν . . . . ἐάν τε τινὰ ἄλλον κ. τ. λ. τοῦτον διώκω κατόπισθε μετ' ἴχνιον ὥστε θεοῖο, — which is undoubtedly the passage alluded to. — *J. S.*]

Exempli gratia; Instantiæ Conformes sunt quæ sequuntur: speculum, et oculus; et similiter fabrica auris, et loca reddentia echo. Ex qua conformitate, præter ipsam observationem similitudinis, quæ ad multa utilis est, proclive est insuper colligere et formare illud axioma; videlicet, organa sensuum et corpora quæ pariunt reflexiones ad sensus esse similis naturæ. Rursus ex hoc ipso admonitus intellectus non ægre insurgit ad axioma quoddam altius et nobilius. Hoc nimirum; nihil interesse inter consensus sive sympathias corporum sensu præditorum, et inanimatorum sine sensu, nisi quod in illis accedat spiritus animalis ad corpus ita dispositum, in his autem absit. Adeo ut quot sint consensus in corporibus inanimatis, tot possint esse sensus in animalibus, si essent perforationes in corpore animato ad discursum spiritus animalis in membrum rite dispositum, tanquam in organum idoneum. Et rursus, quot sint sensus in animalibus, tot sint proculdubio motus in corpore inanimato ubi spiritus animalis abfuerit; licet necesse sit multo plures esse motus in corporibus inanimatis quam sensus in animatis, propter paucitatem organorum sensus. Atque hujus rei ostendit se exemplum valde manifestum in doloribus. Etenim quum sint plura genera doloris in animalibus et tanquam varii illius characteres (veluti alius est dolor ustionis, alius frigoris intensi, alius puncturæ, alius compressionis, alius extensionis, et similium), certissimum est omnia illa, quoad motum, inesse corporibus inanimatis; veluti ligno aut lapidi, cum uritur, aut per gelu constringitur, aut pungitur, aut scinditur, aut flectitur, aut tunditur, et sic de aliis; licet non subintrent sensus, propter absentiam spiritus animalis.

Item Instantiæ Conformes (quod mirum fortasse dictu) sunt radices et rami plantarum. Omne enim vegetabile intumescit, et extrudit partes in circumferentiam, tam sursum quam deorsum. Neque alia est differentia radicum et ramorum, quam quod radix includatur in terra, et rami exponantur aëri et soli.[1] Si quis enim accipiat ramum tenerum et vegetum arboris, atque illum reflectat in aliquam terræ particulam, licet non cohæreat ipsi solo, gignit statim non ramum, sed radicem. Atque vice versa, si terra ponatur superius, atque ita obstruatur lapide aut

[1] In many plants part of the stem grows underground, while in others part at least of the root is above the surface. The true distinction has relation to the functions of the two organs. There is nothing in the root analogous (except under special circumstances) to buds or nodes, and consequently no true ramification.

aliqua dura substantia ut planta cohibeatur nec possit frondescere sursum, edet ramos in aërem deorsum.

Item Instantiæ Conformes sunt gummi arborum, et pleræque gemmæ rupium. Utraque enim nil aliud sunt quam exudationes et percolationes succorum; in primo genere scilicet, succorum ex arboribus; in secundo, ex saxis; unde gignitur claritudo et splendor in utrisque, per percolationem nimirum tenuem et accuratam. Nam inde fit etiam, quod pili animalium non sint tam pulchri et tam vividi coloris quam avium plumæ complures; quia succi non tam delicate percolantur per cutem quam per calamum.

Item Instantiæ Conformes sunt scrotum in animalibus masculis, et matrix in femellis. Adeo ut nobilis illa fabrica per quam sexus differunt, (quatenus ad animalia terrestria) nil aliud videatur esse, quam secundum exterius et interius[1]; vi scilicet majore caloris genitalia in sexu masculo protrudente in exterius, ubi in femellis nimis debilis est calor quam ut hoc facere possit; unde accidit quod contineantur interius.

Item Instantiæ Conformes sunt pinnæ piscium, et pedes quadrupedum, aut pedes et alæ volucrum; quibus addidit Aristoteles quatuor volumina in motu serpentum.[2] Adeo ut in fabrica universi motus viventium plerumque videatur expediri per quaterniones artuum sive flexionum.

Item dentes in animalibus terrestribus, et rostra in avibus, sunt Instantiæ Conformes; unde manifestum est, in omnibus animalibus perfectis, fluere duram quandam substantiam versus os.

Item non absurda est Similitudo et Conformitas illa, ut homo sit tanquam planta inversa. Nam radix nervorum et facultatum animalium est caput; partes autem seminales sunt infimæ, non computatis extremitatibus tibiarum et brachiorum. At in planta, radix (quæ instar capitis est) regulariter infimo loco collocatur; semina autem supremo.[3]

[1] This remark seems to have been suggested by a similar passage in Telesius, *De Rerum Naturâ*, vi. 18.: — "Masculo . . . . magnus datus est calor, qui et membrum genitale foras propellat et sanguinem multum beneque omnem compactum conficiat, &c. Fœminæ autem . . . languens inditus est calor, qui neque genitale vas foras propellere nec è semine spiritum educere queat." The doctrine however of this passage was first taught by Galen, from whom Telesius derived it. See Galen, *De Usu Partium*, xiv. 6.

[2] De Anim. Incessu, i. 7.

[3] On the other hand, one is tempted to trace an analogy between the flower in plants and the skull in man and vertebrate animals in general: each occurring at the end of the axis of development, and each consisting of four segments — whorls or vertebræ. But by far the most remarkable analogy between plants and animals relates to the

Denique illud omnino præcipiendum est et sæpius monendum; ut diligentia hominum in inquisitione et congerie Naturalis Historiæ deinceps mutetur plane, et vertatur in contrarium ejus quod nunc in usu est. Magna enim hucusque atque adeo curiosa fuit hominum industria in notanda rerum varietate atque explicandis accuratis animalium, herbarum, et fossilium differentiis; quarum pleræque magis sunt lusus naturæ quam seriæ alicujus utilitatis versus scientias. Faciunt certe hujusmodi res ad delectationem, atque etiam quandoque ad praxin; verum ad introspiciendam naturam parum aut nihil. Itaque convertenda plane est opera ad inquirendas et notandas rerum similitudines et analoga, tam in integralibus quam partibus. Illæ enim sunt quæ naturam uniunt, et constituere scientias incipiunt.[1]

Verum in his omnino est adhibenda cautio gravis et severa; ut accipiantur pro Instantiis Conformibus et Proportionatis, illæ quæ denotant Similitudines (ut ab initio diximus) Physicas; id est, reales et substantiales et immersas in natura, non fortuitas et ad speciem; multo minus superstitiosas aut curiosas, quales naturalis magiæ scriptores (homines levissimi, et in rebus tam seriis quales nunc agimus vix nominandi) ubique ostentant; magna cum vanitate et desipientia, inanes similitudines et sympathias rerum describentes atque etiam quandoque affingentes.

Verum his missis, etiam in ipsa configuratione mundi in majoribus non sunt negligendæ Instantiæ Conformes; veluti Africa, et regio Peruviana cum continente se porrigente usque ad Fretum Magellanicum. Utraque enim regio habet similes isthmos et similia promontoria, quod non temere accidit.[2]

Item Novus et Vetus Orbis; in eo quod utrique orbes versus

mode of development of their tissues, which, there is reason to believe, were all primarily formed from cells. The evidence in favour of this proposition is perhaps not yet quite complete.

It is curious that, after it had been established in the case of plants, Schleiden conceived that in this unity of original structure he had found a character peculiar to vegetable life, so that the analogy between plants and animals seemed to be impaired by the discovery.

[1] "Natura infinita est, sed qui symbola animadverterit omnia intelliget, licet non omnino," are the words of a great poet, who perhaps also is entitled to be called a great philosopher. They form the motto of one of the happiest illustrations of what Bacon meant by *instantia conformis*,— the Parthenogenesis of Professor Owen.

[2] A. von Humboldt has pointed out the conformity of the opposite shores of the Atlantic — the approximate correspondence between the projections on each side and the recesses on the other. But Bacon apparently compares not the opposite but the corresponding coasts of Africa and America. C. Concepcion would correspond to C. Negro; but the parallelism is not very close.

septentriones lati sunt et exporrecti, versus austrum autem angusti et acuminati.

Item Instantiæ Conformes nobilissimæ sunt frigora intensa in media (quam vocant) aëris regione, et ignes acerrimi qui sæpe reperiuntur erumpentes ex locis subterraneis; quæ duæ res sunt ultimitates et extrema; naturæ scilicet Frigidi versus ambitum cœli, et naturæ Calidi versus viscera terræ; per antiperistasin, sive rejectionem naturæ contrariæ.

Postremo autem in axiomatibus scientiarum notatu digna est Conformitas Instantiarum. Veluti tropus rhetoricæ, qui dicitur Præter Expectatum, conformis est tropo musicæ, qui vocatur Declinatio Cadentiæ. Similiter, postulatum mathematicum, ut *quæ eidem tertio æqualia sunt etiam inter se sint æqualia*, conforme est cum fabrica syllogismi in logica, qui unit ea quæ conveniunt in medio.[1] Denique multum utilis est in quamplurimis sagacitas quædam in conquirendis et indagandis Conformitatibus et Similitudinibus Physicis.

XXVIII.

Inter Prærogativas Instantiarum, ponemus septimo loco *Instantias Monodicas*[2]; quas etiam *Irregulares* sive *Heteroclitas* (sumpto vocabulo a grammaticis) appellare consuevimus. Eæ sunt, quæ ostendunt corpora in concreto, quæ videntur esse extravagantia et quasi abrupta in natura, et minime convenire cum aliis rebus ejusdem generis. Etenim Instantiæ Conformes sunt similes alterius, at Instantiæ Monodicæ sunt sui similes. Usus vero Instantiarum Monodicarum est talis qualis est Instantiarum Clandestinarum: viz. ad evehendam et uniendam naturam ad invenienda genera sive communes naturas, limitandas postea per differentias veras. Neque enim desistendum ab inquisitione donec proprietates et qualitates, quæ inveniuntur in hujusmodi rebus quæ possunt censeri pro miraculis naturæ, reducantur et comprehendantur sub aliqua Forma

[1] The importance of the parallel here suggested was never understood until the present time, because the language of mathematics and of logic has hitherto not been such as to permit the relation between them to be recognised. Mr. Boole's *Laws of Thought* contain the first development of ideas of which the germ is to be found in Bacon and Leibnitz; to the latter of whom the fundamental principle that in logic $a^2 = a$ was known (v. Leibnitz, *Philos. Works*, by Erdmann, 1840, p. 130). It is not too much to say that Mr. Boole's treatment of the subject is worthy of these great names.

Other caculuses of inference (using the word in its widest sense), besides the mathematical and the logical, yet perhaps remain to be developed; but this is a subject on which it is impossible here to enter.

[2] *Monadicas.* See note 3, p. 165. — *J. S.*

sive Lege certa; ut irregularitas sive singularitas omnis reperiatur pendere ab aliqua Forma Communi; miraculum vero illud sit tandem solummodo in differentiis accuratis et gradu et concursu raro, et non in ipsa specie; ubi nunc contemplationes hominum non procedant ultra quam ut ponant hujusmodi res pro secretis et magnalibus naturæ, et tanquam incausabilibus, et pro exceptionibus regularum generalium.

Exempla Instantiarum Monodicarum sunt, sol et luna, inter astra; magnes, inter lapides; argentum vivum, inter metalla; elephas, inter quadrupedes; sensus veneris, inter genera tactus; odor venaticus in canibus, inter genera olfactus. Etiam S litera apud grammaticos, habetur pro Monodica; ob facilem compositionem quam sustinet cum consonantibus, aliquando duplicibus, aliquando triplicibus; quod nulla alia litera facit. Plurimi autem faciendæ sunt hujusmodi instantiæ; quia acuunt et vivificant inquisitionem, et medentur intellectui depravato a consuetudine et ab iis quæ fiunt plerunque.

XXIX.

Inter Prærogativas Instantiarum, ponemus loco octavo *Instantias Deviantes;* errores scilicet naturæ, et vaga, ac monstra: ubi natura declinat et deflectit a cursu ordinario. Differunt enim Errores naturæ ab Instantiis Monodicis in hoc; quod Monodicæ sint miracula specierum, at Errores sint miracula individuorum. Similis autem fere sunt usus; quia rectificant intellectum adversus consueta, et revelant Formas Communes. Neque enim in his etiam desistendum ab inquisitione donec inveniatur causa hujusmodi declinationis. Veruntamen causa illa non exurgit ad Formam aliquam proprie, sed tantum ad *latentem processum* ad Formam. Qui enim vias naturæ noverit, is deviationes etiam facilius observabit. At rursus, qui deviationes noverit, is accuratius vias describet.[1]

Atque in illo differunt etiam ab Instantiis Monodicis, quod multo magis instruant praxin et operativam. Nam novas species generare arduum admodum foret; at species notas variare, et inde rara multa ac inusitata producere, minus arduum. Facilis autem transitus est a miraculis naturæ ad miracula artis. Si enim deprehendatur semel natura in variatione sua, ejusque ratio manifesta fuerit, expeditum erit eo deducere naturam per artem quo per casum aberraverit.

[1] See Owen, *On the Nature of Limbs*, p. 54.

Neque solum eo, sed et aliorsum; cum errores ex una parte monstrent et aperiant viam ad errores et deflexiones undequaque. Hic vero exemplis non est opus, propter eorundem copiam. Facienda enim est congeries sive historia naturalis particularis omnium monstrorum et partuum naturæ prodigiosorum; omnis denique novitatis et raritatis et inconsueti in natura. Hoc vero faciendum est cum severissimo delectu, ut constet fides. Maxime autem habenda sunt pro suspectis quæ pendent quomodocunque a religione, ut prodigia Livii: nec minus, quæ inveniuntur in scriptoribus magiæ naturalis, aut etiam alchymiæ, et hujusmodi hominibus; qui tanquam proci sunt et amatores fabularum. Sed depromenda sunt illa ex gravi et fida historia, et auditionibus certis.

XXX.

Inter Prærogativas Instantiarum, ponemus loco nono *Instantias Limitaneas;* quas etiam *Participia* vocare consuevimus. Eæ vero sunt, quæ exhibent species corporum tales, quæ videntur esse compositæ ex speciebus duabus, vel Rudimenta inter speciem unam et alteram. Hæ vero Instantiæ inter Instantias Monodicas sive Heteroclitas recte numerari possunt: sunt enim in universitate rerum raræ et extraordinariæ. Sed tamen ob dignitatem seorsim tractandæ et ponendæ sunt; optime enim indicant compositionem et fabricam rerum, et innuunt causas numeri et qualitatis specierum ordinariarum in universo, et deducunt intellectum ab eo quod est, ad id quod esse potest.

Harum exempla sunt, muscus, inter putredinem et plantam; cometæ nonnulli, inter stellas et meteora ignita; pisces volantes, inter aves et pisces; vespertiliones, inter aves et quadrupedes; etiam

"Simia quam similis turpissima bestia nobis;"[1]

et partus animalium biformes et commisti ex speciebus diversis, et similia.

XXXI.

Inter Prærogativas Instantiarum ponemus decimo loco *Instantias Potestatis,* sive *Fascium* (sumpto vocabulo ab insignibus imperii), quas etiam *Ingenia,* sive *Manus Hominis* appellare consuevimus. Eæ sunt opera maxime nobilia et perfecta, et tanquam ultima in unaquaque arte. Cum enim hoc agatur

[1] Ennius, quoted by Cicero.

præcipue ut natura pareat rebus et commodis humanis; consentaneum est prorsus, ut opera quæ jampridem in potestate hominis fuerunt (quasi provinciæ antea occupatæ et subactæ) notentur et numerentur; præsertim ea quæ sunt maxime enucleata et perfecta; propterea quod ab istis proclivior et magis in propinquo sit transitus ad nova et hactenus non inventa. Si quis enim ab horum contemplatione attenta propositum acriter et strenue urgere velit, fiet certe ut aut producat illa paulo longius, aut deflectat illa ad aliquid quod finitimum est, aut etiam applicet et transferat illa ad usum aliquem nobiliorem.

Neque hic finis. Verum quemadmodum ab operibus naturæ raris et inconsuetis erigitur intellectus et elevatur ad inquirendas et inveniendas Formas quæ etiam illorum sunt capaces, ita etiam in operibus artis egregiis et admirandis hoc usu-venit; idque multo magis; quia modus efficiendi et operandi hujusmodi miracula artis manifestus ut plurimum est, cum plerunque in miraculis naturæ sit magis obscurus. Attamen in his ipsis cautio est adhibenda vel maxime, ne deprimant scilicet intellectum et eum quasi humo affigant.

Periculum enim est, ne per hujusmodi opera artis, quæ videntur velut summitates quædam et fastigia industriæ humanæ, reddatur intellectus attonitus et ligatus et quasi maleficiatus quoad illa, ita ut cum aliis consuescere non possit, sed cogitet nihil ejus generis fieri posse nisi eadem via qua illa effecta sunt, accedente tantummodo diligentia majore et præparatione magis accurata.

Contra illud ponendum est pro certo: vias et modos efficiendi res et opera quæ adhuc reperta sunt et notata, res esse plerunque pauperculas; atque omnem potentiam majorem pendere et ordine derivari a fontibus Formarum, quarum nulla adhuc inventa est.

Itaque (ut alibi diximus)[1] qui de machinis et arietibus, quales erant apud veteres, cogitasset, licet hoc fecisset obnixe atque ætatem in eo consumpsisset, nunquam tamen incidisset in inventum tormentorum igneorum operantium per pulverem pyrium. Neque rursus, qui in lanificiis et serico vegetabili observationem suam et meditationem collocasset, unquam per ea reperisset naturam vermis aut serici bombycini.

Quocirca omnia inventa quæ censeri possunt magis nobilia

[1] I. § 109.

(si animum advertas) in lucem prodiere nullo modo per pusillas enucleationes et extensiones artium, sed omnino per casum. Nihil autem repræsentat[1] aut anticipat casum (cujus mos est ut tantum per longa sæcula operetur) præter inventionem Formarum.

Exempla autem hujusmodi instantiarum particularia nihil opus est adducere, propter copiam eorundem. Nam hoc omnino agendum; ut visitentur et penitus introspiciantur omnes artes mechanicæ, atque liberales etiam (quatenus ad opera), atque inde facienda est congeries sive historia particularis, tanquam magnalium et operum magistralium et maxime perfectorum in unaquaque ipsarum, una cum modis effectionis sive operationis.

Neque tamen astringimus diligentiam, quæ adhibenda est in hujusmodi collecta, ad ea quæ censentur pro magisteriis et arcanis alicujus artis tantum, atque movent admirationem. Admiratio enim proles est raritatis; siquidem rara, licet in genere sint ex vulgatis naturis, tamen admirationem pariunt.

At contra, quæ revera admirationi esse debent propter discrepantiam quæ inest illis in specie collatis ad alias species, tamen si in usu familiari præsto sint leviter notantur. Debent autem notari Monodica artis, non minus quam Monodica naturæ; de quibus antea diximus.[2] Atque quemadmodum in Monodicis naturæ posuimus solem, lunam, magnetem, et similia, quæ re vulgatissima sunt sed natura tamen fere singulari: idem et de Monodicis artis faciendum est.

Exempli gratia; Instantia Monodica artis est papyrus; res admodum vulgata. At si diligenter animum advertas, materiæ artificiales aut plane textiles sunt per fila directa et transversa; qualia sunt pannus sericus, aut laneus, et linteus, et hujusmodi; aut coagmentantur ex succis concretis; qualia sunt later, aut argilla figularis, aut vitrum, aut esmalta, aut porcellana, et similia; quæ si bene uniantur splendent, sin minus, indurantur certe, sed non splendent. Attamen omnia talia, quæ fiunt ex succis concretis, sunt fragilia, nec ullo modo hærentia et tenacia. At contra, papyrus est corpus tenax, quod scindi et lacerari possit; ita ut imitetur et fere æmuletur pellem sive membranam alicujus animalis, aut folium alicujus vegetabilis, et hujusmodi opificia naturæ. Nam neque fragilis est, ut vitrum;

[1] See note, p. 208.

[2] II. § 28.

neque textilis, ut pannus; sed habet fibras certe, non fila distincta, omnino ad modum materiarum naturalium; ut inter artificiales materias vix inveniatur simile aliquod, sed sit plane Monodicum.[1] Atque præferenda sane sunt in artificialibus ea quæ maxime accedunt ad imitationem naturæ, aut e contrario eam potenter regunt et invertunt.

Rursus, inter Ingenia et Manus Hominis, non prorsus contemnenda sunt præstigiæ et jocularia. Nonnulla enim ex istis, licet sint usu levia et ludicra, tamen informatione valida esse possunt.

Postremo, neque omnino omittenda sunt superstitiosa, et (prout vocabulum sensu vulgari accipitur) magica. Licet enim hujusmodi res sint in immensum obrutæ grandi mole mendaciorum et fabularum, tamen inspiciendum paulisper si forte subsit et lateat in aliquibus earum aliqua operatio naturalis; ut in fascino, et fortificatione imaginationis, et consensu rerum ad distans, et transmissione impressionum a spiritu ad spiritum non minus quam a corpore ad corpus, et similibus.

XXXII.

Ex iis quæ ante dicta sunt, patet quod quinque illa instantiarum genera de quibus diximus (viz. Instantiarum Conformium, Instantiarum Monodicarum, Instantiarum Deviantium, Instantiarum Limitanearum, Instantiarum Potestatis) non debeant reservari donec inquiratur natura aliqua certa (quemadmodum instantiæ reliquæ, quas primo loco proposuimus, nec non plurimæ ex iis quæ sequentur, reservari debent); sed statim jam ab initio facienda est earum collectio, tanquam historia quædam particularis; eo quod digerant ea quæ ingrediuntur intellectum, et corrigant pravam complexionem intellectus ipsius, quem omnino necesse est imbui et infici et demum perverti ac distorqueri ab incursibus quotidianis et consuetis.

Itaque adhibendæ sunt eæ instantiæ tanquam præparativum aliquod, ad rectificandum et expurgandum intellectum. Quicquid enim abducit intellectum a consuetis æquat et complanat aream ejus ad recipiendum lumen siccum et purum notionum verarum.

Quin etiam hujusmodi instantiæ sternunt et præstruunt viam

[1] It is curious that Bacon should not have remarked that all the qualities here mentioned belong to felt as well as to paper.

ad operativam; ut suo loco dicemus, quando de *Deductionibus ad Praxin* sermo erit.

XXXIII.

Inter Prærogativas Instantiarum ponemus loco undecimo *Instantias Comitatus*, atque *Hostiles;* quas etiam *Instantias Propositionum Fixarum* appellare consuevimus. Eæ sunt instantiæ, quæ exhibent aliquod corpus sive concretum tale, in quo natura inquisita perpetuo sequatur tanquam comes quidam individuus; aut contra, in quo natura inquisita perpetuo fugiat atque ex comitatu excludatur, ut hostis et inimicus. Nam ex hujusmodi instantiis formantur propositiones certæ et universales, aut affirmativæ aut negativæ; in quibus subjectum erit tale corpus in concreto, prædicatum vero natura ipsa inquisita. Etenim propositiones particulares omnino *fixæ* non sunt, ubi scilicet natura inquisita reperitur in aliquo concreto fluxa et mobilis, viz. accedens sive acquisita, aut rursus recedens sive deposita. Quocirca particulares propositiones non habent Prærogativam aliquam majorem, nisi tantum in casu Migrationis, de quo antea dictum est. Et nihilominus, etiam particulares illæ propositiones comparatæ et collatæ cum universalibus multum juvant; ut suo loco dicetur. Neque tamen, etiam in universalibus istis propositionibus exactam aut absolutam affirmationem vel abnegationem requirimus. Sufficit enim ad id quod agitur etiamsi exceptionem nonnullam singularem aut raram patiantur.

Usus autem Instantiarum Comitatus est ad angustiandam Affirmativam Formæ. Quemadmodum enim in Instantiis Migrantibus angustiatur Affirmativa Formæ ; viz. ut necessario poni debeat Forma rei esse aliquid quod per actum illum Migrationis inditur aut destruitur; ita etiam in Instantiis Comitatus angustiatur Affirmativa Formæ ; ut necessario poni debeat Forma rei esse aliquid quod talem concretionem corporis subingrediatur, aut contra ab eadem abhorreat; ut qui bene norit constitutionem aut schematismum hujusmodi corporis non longe abfuerit ab extrahenda in lucem Forma naturæ inquisitæ.

Exempli gratia; sit natura inquisita Calidum. Instantia Comitatus est flamma. Etenim in aqua, aëre, lapide, metallo, et aliis quamplurimis, calor est mobilis, et accedere potest et recedere; at omnis flamma est calida, ita ut calor in concretione flammæ perpetuo sequatur. At Instantia Hostilis Calidi nulla reperitur apud nos. Nam de visceribus terræ nihil constat ad

sensum; sed eorum corporum quæ nobis nota sunt nulla prorsus est concretio quæ non est susceptibilis caloris.

At rursus, sit natura inquisita Consistens. Instantia Hostilis est aër. Etenim metallum potest fluere, potest consistere; similiter vitrum; etiam aqua potest consistere, cum conglaciatur: at impossibile est ut aër unquam consistat, aut exuat fluorem.

Verum de instantiis hujusmodi Propositionum Fixarum supersunt duo monita, quæ utilia sunt ad id quod agitur. Primum, ut si defuerit plane universalis Affirmativa aut Negativa, illud ipsum diligenter notetur tanquam non-ens; sicut fecimus de Calido, ubi universalis Negativa (quatenus ad entia quæ ad nostram notitiam pervenerint) in rerum natura deest. Similiter, si natura inquisita sit Æternum aut Incorruptibile, deest Affirmativa universalis hic apud nos. Neque enim prædicari potest Æternum aut Incorruptibile de aliquo corpore eorum quæ infra cœlestia sunt, aut supra interiora terræ. Alterum monitum est, ut propositionibus universalibus, tam affirmativis quam negativis, de aliquo concreto, subjungantur simul ea concreta quæ proxime videntur accedere ad id quod est ex non-entibus; ut in calore, flammæ mollissimæ et minimum adurentes; in incorruptibili, aurum, quod proxime accedit. Omnia enim ista indicant terminos naturæ inter ens et non-ens; et faciunt ad circumscriptiones Formarum, ne gliscant et vagentur extra conditiones materiæ.

XXXIV.

Inter Prærogativas Instantiarum, ponemus loco duodecimo ipsas illas *Instantias Subjunctivas*, de quibus in superiori aphorismo diximus; quas etiam *Instantias Ultimitatis* sive *Termini* appellare consuevimus. Neque enim hujusmodi instantiæ utiles sunt tantum, quatenus subjunguntur propositionibus fixis; verum etiam per se, et in proprietate sua. Indicant enim non obscure veras sectiones naturæ, et mensuras rerum, et illud *Quousque* natura quid faciat et ferat, et deinde transitus naturæ ad aliud. Talia sunt, aurum, in pondere; ferrum, in duritie; cete, in quantitate animalium; canis, in odore; inflammatio pulveris pyrii, in expansione celeri; et alia id genus. Nec minus exhibenda sunt ea quæ sunt ultima gradu infimo, quam quæ supremo; ut spiritus vini, in pondere[1];

[1] Although precise directions for making ether were given by Valerius Cordus in 1544, yet it is said to have remained unnoticed until it was rediscovered in the

sericum, in mollitie; vermiculi cutis, in quantitate animalium; et cætera.

XXXV.

Inter Prærogativas Instantiarum, ponemus loco decimo tertio *Instantias Fœderis* sive *Unionis*. Eæ sunt, quæ confundunt et adunant naturas quæ existimantur esse heterogeneæ, et pro talibus notantur et signantur per divisiones receptas.

At Instantiæ Fœderis ostendunt operationes et effectus quæ deputantur alicui ex illis heterogeneis ut propria, competere etiam aliis ex heterogeneis; ut convincatur ista heterogenia (quæ in opinione est) vera non esse aut essentialis, sed nil aliud esse quam modificatio naturæ communis. Optimi itaque sunt usus ad elevandum et evehendum intellectum a differentiis ad genera; et ad tollendum larvas et simulachra rerum, prout occurrunt et prodeunt personatæ in substantiis concretis.

Exempli gratia: sit natura inquisita Calidum. Omnino videtur esse divisio solennis et authentica quod sint tria genera caloris; viz. calor cœlestium, calor animalium, et calor ignis; quodque isti calores (præsertim unus ex illis comparatus ad reliquos duos) sint ipsa essentia et specie, sive natura specifica, differentes et plane heterogenei; quandoquidem calor cœlestium et animalium generet et foveat, at calor ignis contra corrumpat et destruat. Est itaque Instantia Fœderis experimentum illud satis vulgatum, cum recipitur ramus aliquis vitis intra domum ubi sit focus assiduus, ex quo maturescunt uvæ etiam mense integro citius quam foras; ita ut maturatio fructus etiam pendentis super arborem fieri possit scilicet ab igne, cum hoc ipsum videatur esse opus proprium solis.[1] Itaque ab hoc initio

eighteenth century. Bacon's want of acquaintance with it, implied in this and other passages, is therefore not surprising.

[1] The regular use of artificial heat in green-houses and conservatories was not known in Bacon's time. In the *Maison Champêtre*, an encyclopædia of gardening and agriculture published in 1607, nothing is said of it; nor is there anything on the subject in the writings of Porta, though in his *Nat. Mag.* he has spoken of various modes of accelerating the growth of fruits and flowers. In the *Sylva Sylvarum* (412.), however, Bacon speaks of housing hot-country plants to save them, and, in the *Essay on Gardens*, of stoving myrtles. The idea of what are now called green-houses was introduced into England from Holland about the time of the Revolution. The orangery at Heidelberg, formed, I believe, about the middle of the seventeenth century, is said to be the earliest conservatory on record.

It is related that Albertus Magnus, entertaining the emperor at Cologne during the winter, selected for the place of entertainment the garden of his monastery. Everything was covered with snow, and the guests were much inclined to be discontented; but when the feast began, the snow cleared away; the trees put forth, first leaves, then blossoms, then fruit; and the climate became that of summer. This glorious summer, which had thus abruptly succeeded to the winter of their discontent, lasted

facile insurgit intellectus, repudiata heterogenia essentiali, ad inquirendum quæ sint differentiæ illæ quæ revera reperiuntur inter calorem solis et ignis, ex quibus fit ut eorum operationes sint tam dissimiles, utcunque illi ipsi participent ex natura communi.

Quæ differentiæ reperientur quatuor; viz. primo quod calor solis respectu caloris ignis sit gradu longe clementior et lenior; secundo, quod sit (præsertim ut defertur ad nos per aërem) qualitate multo humidior; tertio (quod caput rei est) quod sit summe inæqualis, atque accedens et auctus, et deinceps recedens et diminutus; id quod maxime confert ad generationem corporum. Recte enim asseruit Aristoteles[1] causam principalem generationum et corruptionum quæ fiunt hic apud nos in superficie terræ, esse viam obliquam solis per zodiacum; unde calor solis, partim per vicissitudines diei et noctis, partim per successiones æstatis et hyemis, evadit miris modis inæqualis. Neque tamen desinit ille vir id quod ab eo recte inventum fuit statim corrumpere et depravare. Nam ut arbiter scilicet naturæ (quod illi in more est) valde magistraliter assignat causam generationis accessui solis, causam autem corruptionis recessui; cum utraque res (accessus videlicet solis et recessus) non respective, sed quasi indifferenter, præbeat causam tam generationi quam corruptioni; quandoquidem inæqualitas caloris generationi et corruptioni rerum, æqualitas conservationi tantum, ministret. Est et quarta differentia inter calorem solis et ignis, magni prorsus momenti; viz. quod sol operationes suas insinuet per longa temporis spatia, ubi operationes ignis (urgente hominum impatientia) per breviora intervalla ad exitum perducantur. Quod si quis id sedulo agat, ut calorem ignis attemperet et reducat ad gradum moderatiorem et leniorem (quod multis modis facile fit), deinde etiam inspergat et admisceat nonnullam humiditatem, maxime autem si imitetur calorem solis in inæqualitate, postremo si moram patienter toleret (non certe eam quæ sit proportionata operibus solis, sed largiorem quam homines adhibere solent in operibus ignis), is facile missam faciet heterogeniam illam caloris, et vel tentabit vel exæquabit vel in aliquibus vincet opera solis, per calorem ignis. Similis

only till the conclusion of the feast, when everything resumed its former aspect. It would be a fanciful explanation, and I know not whether it has ever been suggested, to say that Albertus Magnus really entertained the emperor in a conservatory, and only led his guests through the garden. See, for the story, Grimm's *Deutsche Sagen*

[1] Meteorologia, i. 14.

Instantia Fœderis est resuscitatio papilionum ex frigore stupentium et tanquam emortuarum, per exiguum teporem ignis; ut facile cernas non magis negatum esse igni vivificare animantia quam maturare vegetabilia. Etiam inventum illud celebre Fracastorii de sartagine acriter calefacta, qua circundant medici capita apoplecticorum desperatorum[1], expandit manifeste spiritus animales ab humoribus et obstructionibus cerebri compressos et quasi extinctos, illosque ad motum excitat, non aliter quam ignis operatur in aquam aut aërem, et tamen per consequens vivificat. Etiam ova aliquando excluduntur per calorem ignis, id quod prorsus imitatur calorem animalem; et complura ejusmodi; ut nemo dubitare possit quin calor ignis in multis subjectis modificari possit ad imaginem caloris cœlestium et animalium.[2]

Similiter sint naturæ inquisitæ Motus et Quies. Videtur esse divisio solennis atque ex intima philosophia, quod corpora naturalia vel rotent, vel ferantur recta, vel stent sive quiescant. Aut enim est motus sine termino, aut statio in termino, aut latio ad terminum. At motus ille perennis rotationis videtur esse cœlestium proprius; statio sive quies videtur competere globo ipsi terræ; at corpora cætera (gravia quæ vocant et levia, extra loca scilicet connaturalitatis suæ sita) feruntur recta ad massas sive congregationes similium; levia sursum, versus ambitum cœli; gravia deorsum, versus terram. Atque ista pulchra dictu sunt.

At Instantia Fœderis est cometa aliquis humilior; qui cum sit longe infra cœlum, tamen rotat. Atque commentum Aristotelis[3] de alligatione sive sequacitate cometæ ad astrum aliquod jampridem explosum est; non tantum quia ratio ejus non est probabilis, sed propter experientiam manifestam discursus et irregularis motus cometarum per varia loca cœli.

At rursus alia Instantia Fœderis circa hoc subjectum est

[1] It is mentioned in the life of Fracastorius, that when dying of apoplexy, and speechless, he made signs for the application of a cucurbita (or cupping-vessel) to his head, remembering the remarkable cure which he had effected in the case of a nun at Verona. It is scarcely necessary to remark that "dry cupping," as it is called, acts simply by partially removing the pressure of the atmosphere: the heat applied to the vessel has no other effect than that of rarefying the air it contains.

[2] Bacon's rejection of the essential heterogeneity of the three species of heat is apparently taken from Telesius, *De Rerum Nat.* vi. 20. Telesius remarks, as Bacon does, that eggs may be hatched, and insects apparently dead restored to life, by means of artificial heat.

[3] Meteorol. i. 4.

motus aëris; qui intra tropicos (ubi circuli rotationis sunt majores) videtur et ipse rotare ab oriente in occidentem.

Et alia rursus instantia foret fluxus et refluxus maris, si modo aquæ ipsæ deprehendantur ferri motu rotationis (licet tardo et evanido) ab oriente in occidentem; ita tamen ut bis in die repercutiantur. Itaque, si hæc ita se habeant, manifestum est motum istum rotationis non terminari in cœlestibus, sed communicari aëri et aquæ.

Etiam ista proprietas levium, nimirum ut ferantur sursum, vacillat nonnihil. Atque in hoc sumi potest pro Instantia Fœderis bulla aquæ. Si enim aër fuerit subter aquam, ascendit rapide versus superficiem aquæ, per motum illum plagæ (quam vocat Democritus) per quam aqua descendens percutit et attollit aërem sursum; non autem per contentionem aut nixum aëris ipsius. Atqui ubi ad superficiem ipsam aquæ ventum fuerit, tum cohibetur aër ab ulteriore ascensu, per levem resistentiam quam reperit in aqua, non statim tolerante se discontinuari: ita ut exilis admodum sit appetitus aëris ad superiora.

Similiter sit natura inquisita Pondus. Est plane divisio recepta, ut densa et solida ferantur versus centrum terræ, rara autem et tenuia versus ambitum cœli; tanquam ad loca sua propria. Atque loca quod attinet, (licet in scholis hujusmodi res valeant) plane inepta et puerilis cogitatio est, locum aliquid posse. Itaque nugantur philosophi cum dicant quod, si perforata esset terra, corpora gravia se sisterent quando ventum esset ad centrum. Esset enim certe virtuosum plane et efficax genus nihili, aut puncti mathematici, quod aut alia afficeret, aut rursus quod alia appeterent: corpus enim non nisi a corpore patitur. Verum iste appetitus ascendendi et descendendi aut est in schematismo corporis quod movetur, aut in sympathia sive consensu cum alio corpore. Quod si inveniatur aliquod corpus densum et solidum, quod nihilominus non feratur ad terram, confunditur hujusmodi divisio. At si recipiatur opinio Gilberti, quod magnetica vis terræ ad alliciendum gravia non extendatur ultra orbem virtutis suæ (quæ operatur semper ad distantiam certam, et non ultra)[1], hocque per aliquam

[1] In Gilbert's philosophy, the earth's magnetic action is not distinguished from gravity. Thus he says: "Partes vero primariorum globorum integris alligatæ sunt, in illos naturali desiderio incumbunt. . . . . Non autem est appetitus aut inclinatio ad locum, aut spatium, aut terminum; sed ad corpus, ad fontem, ad matrem, ad principium ubi uniuntur, conservantur, et a periculis vagæ partes revocatæ quiescunt omnes.

Instantiam verificetur, ea demum erit Instantia Fœderis circa hoc subjectum. Neque tamen occurrit impræsentiarum aliqua instantia super hoc certa et manifesta. Proxime videntur accedere cataractæ cœli, quæ in navigationibus per Oceanum Atlanticum versus Indias utrasque sæpe conspiciuntur. Tanta enim videtur esse vis et moles aquarum quæ per hujusmodi cataractas subito effunditur, ut videatur collectio aquarum fuisse ante facta, atque in his locis hæsisse et mansisse; et postea potius per causam violentam dejecta et detrusa esse, quam naturali motu gravitatis cecidisse; adeo ut conjici possit, corpoream molem densam atque compactam in magna distantia a terra fore pensilem tanquam terram ipsam, nec casuram nisi dejiciatur. Verum de hoc nil certi affirmamus. Interim in hoc et in multis aliis facile apparebit, quam inopes simus historiæ naturalis; cum loco instantiarum certarum nonnunquam suppositiones afferre pro exemplis cogamur.

Similiter sit natura inquisita Discursus Ingenii. Videtur omnino divisio vera, rationis humanæ et solertiæ brutorum. Attamen sunt nonnullæ instantiæ actionum quæ eduntur a brutis, per quas videntur etiam bruta quasi syllogizare; ut memoriæ proditum est de corvo, qui per magnas siccitates fere enectus siti conspexit aquam in trunco cavo arboris; atque cum non daretur ei intrare propter angustias, non cessavit jacere multos lapillos, per quos surgeret et ascenderet aqua ut bibere posset; quod postea cessit in proverbium.

Similiter sit natura inquisita Visibile. Videtur omnino esse divisio vera et certa, lucis, quæ est visibile originale et primam copiam facit visui, et coloris, qui est visibile secundarium et sine luce non cernitur, ita ut videatur nil aliud esse quam imago aut modificatio lucis.[1] Attamen ex utraque parte circa hoc videntur esse Instantiæ Fœderis; scilicet, nix in

Ita tellus allicit magnetica omnia, tum alia omnia in quibus vis magnetica primaria desiit materiæ ratione; quæ inclinatio in terrenis gravitas dicitur." — *De Mundo*, ii. c. 3. Again, that the magnetic action of the earth or of a magnet is confined to a definite orb appears from a variety of passages. See *De Magnete*, ii. c. 7., and the definitions prefixed to this work. Gilbert distinguished between the "orb of virtue," which includes the whole space through which any magnetic action extends, and the "orb of coition," which is "totum illud spatium per quod minimum magneticum per magnetem movetur." He asserts that the orb of the magnetic virtue extends to the moon, and ascribes the moon's inequalities to the effects it produces (*De Mundo*, ii. c. 19.). In the preceding chapter he remarks, "Luna magnetice alligatur terræ, quia facies ejus semper versus terram."

[1] The doctrine of this passage seems to be taken from Telesius, *De Rerum Naturâ*, vii. c. 31.: —"Sensus ipse primo illam [lucem] et per se visilem colores siquidem visiles, at secundo a luce loco et lucis omnino opera visiles declarat."

magna quantitate, et flamma sulphuris; in quarum altera videtur esse color primulum lucens, in altera lux vergens ad colorem.

XXXVI.

Inter Prærogativas Instantiarum, ponemus loco decimo quarto *Instantias Crucis;* translato vocabulo a Crucibus, quæ erectæ in biviis indicant et signant viarum separationes. Has etiam *Instantias Decisorias* et *Judiciales*, et in casibus nonnullis *Instantias Oraculi* et *Mandati*, appellare consuevimus. Earum ratio talis est. Cum in inquisitione naturæ alicujus intellectus ponitur tanquam in æquilibrio, ut incertus sit utri naturarum e duabus, vel quandoque pluribus, causa naturæ inquisitæ attribui aut assignari debeat, propter complurium naturarum concursum frequentem et ordinarium, Instantiæ Crucis ostendunt consortium unius ex naturis (quoad naturam inquisitam) fidum et indissolubile, alterius autem varium et separabile; unde terminatur quæstio, et recipitur natura illa prior pro causa, missa altera et repudiata. Itaque hujusmodi instantiæ sunt maximæ lucis, et quasi magnæ auctoritatis; ita ut curriculum interpretationis quandoque in illas desinat, et per illas perficiatur. Interdum autem Instantiæ Crucis illæ occurrunt et inveniuntur inter jampridem notatas; at ut plurimum novæ sunt, et de industria atque ex composito quæsitæ et applicatæ, et diligentia sedula et acri tandem erutæ.[1]

Exempli gratia; sit natura inquisita Fluxus et Refluxus Maris, ille bis repetitus in die atque sexhorarius in accessibus et recessibus singulis, cum differentia nonnulla quæ coincidit in motum lunæ. Bivium circa hanc naturam tale est.

Necesse prorsus est ut iste motus efficiatur, vel ab aquarum progressu et regressu, in modum aquæ in pelvi agitatæ, quæ quando latus unum pelvis alluit deserit alterum; vel a sublatione et subsidentia aquarum e profundo, in modum aquæ ebullientis et rursus subsidentis. Utri vero causæ fluxus et refluxus ille assignari debeat, oritur dubitatio. Quod si recipiatur prior assertio, necesse est ut cum sit fluxus in mari ex una parte fiat sub idem tempus alicubi in mari refluxus ex alia. Itaque ad hoc reducitur inquisitio. Atqui observavit Acosta, cum aliis nonnullis (dili-

[1] These are instances of the experiments spoken of in the *Distributio Operis*, "quæ ad intentionem ejus quod quæritur peritè et secundum artem excogitata et apposita sunt." (p. 138.)—*J. S.*

genti facta inquisitione), quod ad litora Floridæ et ad litora adversa Hispaniæ et Africæ, fiant fluxus maris ad eadem tempora, et refluxus itidem ad eadem tempora; non contra, quod cum fluxus fit ad littora Floridæ, fiat refluxus ad littora Hispaniæ et Africæ.[1] Attamen adhuc diligentius attendenti, non per hoc evincitur motus attollens, et abnegatur motus in progressu. Fieri enim potest, quod sit motus aquarum in progressu, et nihilominus inundet adversa littora ejusdem alvei simul; si aquæ scilicet illæ contrudantur et compellantur aliunde, quemadmodum fit in fluviis, qui fluunt et refluunt ad utrumque littus horis iisdem, cum tamen iste motus liquido sit motus in progressu, nempe aquarum ingredientium ostia fluminum ex mari. Itaque simili modo fieri potest, ut aquæ venientes magna mole ab Oceano Orientali Indico compellantur et trudantur in alveum Maris Atlantici, et propterea inundent utrumque latus simul. Quærendum itaque est, an sit alius alveus per quem aquæ possint iisdem temporibus minui et refluere. Atque præsto est Mare Australe, Mari Atlantico neutiquam minus, sed potius magis latum et extensum, quod ad hoc sufficere possit.

Itaque jam tandem perventum est ad Instantiam Crucis circa hoc subjectum. Ea talis est: si pro certo inveniatur, quod cum fit fluxus ad littora adversa tam Floridæ quam Hispaniæ in Mari Atlantico, fiat simul fluxus ad littora Peruviæ et juxta dorsum Chinæ in Mari Australi; tum certe per hanc Instantiam Decisoriam abjudicanda est assertio quod fluxus et refluxus maris, de quo inquiritur, fiat per motum progressivum: neque enim relinquitur aliud mare aut locus, ubi possit ad eadem tempora fieri regressus aut refluxus. Commodissime autem hoc sciri possit, si inquiratur ab incolis Panamæ et Limæ (ubi uterque Oceanus, Atlanticus et Australis, per parvum Isthmum separantur), utrum ad contrarias Isthmi partes fiat simul fluxus et refluxus maris, an e contra. Verum hæc decisio sive abjudicatio certa videtur, posito quod terra stet immobilis. Quod si terra rotet, fieri fortasse potest ut ex inæquali rotatione (quatenus ad celeritatem sive incitationem) terræ et aquarum maris, sequatur compulsio violenta aquarum in cumulum sursum, quæ sit fluxus; et relaxatio earundem (postquam amplius cumulari non sustinuerint) in deorsum, quæ sit re-

[1] Compare the *De Fluxu et Refluxu Maris*. I have not been able to find this statement in Acosta, who speaks of the synchronism of the tides on the opposite sides of South America, as shown by the meeting of the tidal waves in the Straits of Magellan. (iii. 14.)

fluxus. Verum de hoc facienda est inquisitio separatim. Attamen etiam hoc supposito illud æque manet fixum, quod necesse sit fieri alicubi refluxum maris ad eadem tempora quibus fiunt fluxus in aliis partibus.

Similiter, sit natura inquisita posterior ille motus ex duobus quos supposuimus, videlicet motus maris se attollens et rursus subsidens; si forte ita acciderit ut (diligenti facto examine) rejiciatur motus alter, de quo diximus, progressivus. Tum vero erit trivium circa hanc naturam tale. Necesse est ut motus iste, per quem aquæ in fluxibus et refluxibus se attollunt et rursus relabuntur, absque aliqua accessione aquarum aliarum quæ advolvuntur, fiat per unum ex his tribus modis; vel quod ista aquarum copia emanet ex interioribus terræ et rursus in illa se recipiat; vel quod non sit aliqua amplior moles aquarum, sed quod eædem aquæ (non aucto quanto suo) extendantur sive rarefiant, ita ut majorem locum et dimensionem occupent, et rursus se contrahant; vel quod nec copia accedat major nec extensio amplior, sed eædem aquæ (prout sunt tam copia quam densitate aut raritate) per vim aliquam magneticam desuper eas attrahentem et evocantem, et per consensum, se attollant et deinde se remittant. Itaque reducatur (si placet) jam inquisitio (missis duobus illis motibus prioribus) ad hunc ultimum; et inquiratur si fiat aliqua talis sublatio per consensum sive vim magneticam. Atqui primo manifestum est universas aquas, prout ponuntur in fossa sive cavo maris, non posse simul attolli, quia defuerit quod succedat in fundo; adeo ut si foret in aquis aliquis hujusmodi appetitus se attollendi, ille ipse tamen a nexu rerum, sive (ut vulgo loquuntur) ne detur vacuum, fractus foret et cohibitus. Relinquitur, ut attollantur aquæ ex aliqua parte, et per hoc minuantur et cedant ex alia. Enimvero rursus necessario sequetur ut vis illa magnetica, cum super totum operari non possit, circa medium operetur intensissime; ita ut aquas in medio attollat, illæ vero sublatæ latera per successionem deserant et destituant.

Itaque jam tandem perventum est ad Instantiam Crucis circa hoc subjectum. Ea talis est: si inveniatur quod in refluxibus maris aquarum superficies in mari sit arcuata magis et rotunda, attollentibus se scilicet aquis in medio maris et deficientibus circa latera, quæ sunt litora; et in fluxibus eadem superficies sit magis plana et æqua, redeuntibus scilicet aquis ad priorem suam positionem; tum certe per hanc Instantiam Decisoriam

potest recipi sublatio per vim magneticam, aliter prorsus abjudicanda est. Hoc vero in fretis per lineas nauticas non difficile est experiri[1]; videlicet utrum in refluxibus versus medium maris, mare non sit magis altum sive profundum quam in fluxibus. Notandum autem est, si hoc ita sit, fieri (contra ac creditur) ut attollant se aquæ in refluxibus, demittant se tantum in fluxibus, ita ut littora vestiant et inundent.

Similiter, sit natura inquisita Motus Rotationis spontaneus; et speciatim, utrum Motus Diurnus, per quem sol et stellæ ad conspectum nostrum oriuntur et occidunt, sit motus rotationis verus in cœlestibus, aut motus apparens in cœlestibus, verus in terra. Poterit esse Instantia Crucis super hoc subjectum talis. Si inveniatur motus aliquis in oceano ab oriente in occidentem, licet admodum languidus et enervatus; si idem motus reperiatur paulo incitatior in aëre, præsertim intra tropicos, ubi propter majores circulos est magis perceptibilis; si idem motus reperiatur in humilioribus cometis, jam factus vivus et validus; si idem motus reperiatur in planetis, ita tamen dispensatus et graduatus ut quo propius absit a terra sit tardior, quo longius celerior, atque in cœlo demum stellato sit velocissimus; tum certe recipi debet motus diurnus pro vero in cœlis, et abnegandus est motus terræ; quia manifestum erit, motum ab oriente in occidentem esse plane cosmicum et ex consensu universi, qui in summitatibus cœli maxime rapidus gradatim labascat, et tandem desinat et exstinguatur in immobili, videlicet terra.[2]

Similiter, sit natura inquisita Motus Rotationis ille alter apud astronomos decantatus, renitens et contrarius Motui Diurno, videlicet ab occidente in orientem; quem veteres astronomi attribuunt planetis, etiam cœlo stellato; at Copernicus et ejus sectatores terræ quoque; et quæratur utrum inveniatur in rerum natura aliquis talis motus, an potius res conficta sit et supposita, ad compendia et commoditates calculationum, et ad pulchrum illud, scilicet de expediendis motibus cœlestibus per circulos perfectos. Neutiquam enim evincitur iste motus esse

[1] It is scarcely necessary to remark that wherever soundings are possible, tidal phenomena are derivative, and give no direct information as to the form the ocean would assume if the hypothesis of the equilibrium theory represented the reality.

[2] Nothing shows better than an instance of this kind, the impossibility of reducing philosophical reasoning to a uniform method of exclusion. How could the analogical argument in the text be stated in accordance with what Bacon seems to recognise as the only true form of induction, — that, namely, which proceeds by exclusion? The argument depends on a wholly non-logical element, the conviction of the unity and harmony of nature.

in supernis verus et realis, nec per defectum restitutionis planetæ in motu diurno ad idem punctum cœli stellati, nec per diversam politatem zodiaci, habito respectu ad polos mundi; quæ duo nobis hunc motum pepererunt. Primum enim phænomenon per anteversionem et derelictionem optime salvatur; secundum per lineas spirales; adeo ut inæqualitas restitutionis et declinatio ad tropicos possint esse potius modificationes motus unici illius diurni, quam motus renitentes aut circa diversos polos. Et certissimum est, si paulisper pro plebeiis nos geramus (missis astronomorum et scholæ commentis, quibus illud in more est ut sensui in multis immerito vim faciant, et obscuriora malint), talem esse motum istum ad sensum, qualem diximus; cujus imaginem per fila ferrea (veluti in machina) aliquando repræsentari fecimus.[1]

Verum Instantia Crucis super hoc subjectum poterit esse talis. Si inveniatur in aliqua historia fide digna, fuisse cometam aliquem vel sublimiorem vel humiliorem qui non rotaverit cum consensu manifesto (licet admodum irregulariter) Motus Diurni, sed potius rotaverit in contrarium cœli, tum certe hucusque judicandum est posse esse in natura aliquem talem motum. Sin nihil hujusmodi inveniatur, habendus est pro suspecto, et ad alias Instantias Crucis circa hoc confugiendum.

Similiter, sit natura inquisita, Pondus sive Grave. Bivium circa hanc naturam tale est. Necesse est ut gravia et ponderosa vel tendant ex natura sua ad centrum terræ, per proprium schematismum; vel ut a massa corporea ipsius terræ, tanquam a congregatione corporum connaturalium, attrahantur et rapiantur, et ad eam per consensum ferantur. At posterius hoc si in causa sit, sequitur ut quo propius gravia appropinquant ad terram, eo fortius et majore cum impetu ferantur ad eam; quo longius ab ea absint, debilius et tardius (ut fit in attractionibus magneticis); idque fieri intra spatium certum; adeo ut si elongata fuerint a terra tali distantia ut virtus terræ in ea agere non possit, pensilia mansura sint, ut et ipsa terra, nec omnino decasura.

[1] This passage does the author little credit. He does not seem to have perceived that the resolution of the apparent motion into other simpler motions was an essentially necessary step before the phenomena could be grouped together in any general law. The transition from the apparent motion to the real motions could never have been made unless the former had been resolved in the manner which Bacon here condemns. From the concluding remark no astronomer would have dissented, "talem esse motum ad sensum, qualem diximus." About this there can be no question; but the whole passage shows how little Bacon understood the scope and the value of the astronomy of his own time.

Itaque talis circa hanc rem poterit esse Instantia Crucis. Sumatur horologium ex iis quæ moventur per pondera plumbea, et aliud ex iis quæ moventur per compressionem laminæ ferreæ; atque vere probentur, ne alterum altero velocius sit aut tardius; deinde ponatur horologium illud movens per pondera super fastigium alicujus templi altissimi, altero illo infra detento; et notetur diligenter si horologium in alto situm tardius moveatur quam solebat, propter diminutam virtutem ponderum. Idem fiat experimentum in profundis minerarum alte sub terra depressarum, utrum horologium hujusmodi non moveatur velocius quam solebat, propter auctam virtutem ponderum. Quod si inveniatur virtus ponderum minui in sublimi, aggravari in subterraneis, recipiatur pro causa ponderis attractio a massa corporea terræ.[1]

Similiter, sit natura inquisita Verticitas Acus Ferreæ, tactæ magnete. Circa hanc naturam tale erit bivium. Necesse est ut tactus magnetis vel ex se indat ferro verticitatem ad septentriones et austrum; vel ut excitet ferrum tantummodo et habilitet, motus autem ipse indatur ex præsentia terræ; ut Gilbertus opinatur, et tanto conatu probare nititur. Itaque huc spectant ea quæ ille perspicaci industria conquisivit. Nimirum quod clavus ferreus, qui diu duravit in situ versus septentriones et austrum, colligat mora diutina verticitatem, absque tactu magnetis; ac si terra ipsa, quæ ob distantiam debiliter operatur (namque superficies aut extima incrustatio terræ virtutis magneticæ, ut ille vult, expers est), per moram tamen longam magnetis tactum suppleret, et ferrum exciret, deinde excitum conformaret et verteret. Rursus, quod ferrum ignitum et candens, si in exstinctione sua exporrigatur inter septentriones

[1] Nothing can be more ingenious than the instantia crucis here proposed. A series of observations were made by Dr. Whewell and Mr. Airy to determine the effect on the time of vibration of a pendulum, produced by carrying it to the bottom of a mine; but, probably from the effect of local attractions, the results were scarcely as satisfactory as might have been expected. In the autumn of 1854, Mr. Airy instituted similar experiments in the Harton Colliery. They appear likely to afford more satisfactory results than the older series made at Dolcoath.

Voltaire cites the passage in the text in support of his remark that "le plus grand service, peut-être, que F. Bacon ait rendu à la philosophie a été de deviner l'attraction." But in reality the notion of attraction in one form or other (e. g. the attraction of the sea by the moon) sprang up in the infancy of physical speculation; and it cannot be affirmed that Bacon's ideas on the subject were as clear as those of his predecessor William Gilbert. (See note on *De Aug.* ii. 13.) By an error similar to Voltaire's, some of Dante's commentators have claimed for him the credit of being the first to indicate the true cause of the tides. The passage on which this claim is founded is in the *Paradiso*, xvi. 82.

et austrum, colligat quoque verticitatem absque tactu magnetis; ac si partes ferri in motu positæ per ignitionem, et postea se recipientes, in ipso articulo extinctionis suæ magis essent susceptivæ et quasi sensitivæ virtutis manantis a terra quam alias, et inde fierent tanquam excitæ. Verum hæc, licet bene observata, tamen non evincunt prorsus quod ille asserit.[1]

Instantia Crucis autem circa hoc subjectum poterit esse talis. Capiatur terrella[2] ex magnete, et notentur poli ejus; et ponantur poli terrellæ versus orientem et occasum, non versus septentriones et austrum, atque ita jaceant; deinde superponatur acus ferrea intacta, et permittatur ita manere ad dies sex aut septem. Acus vero (nam de hoc non dubitatur) dum manet super magnetem, relictis polis mundi, se vertet ad polos magnetis; itaque quamdiu ita manet, vertitur scilicet ad orientem et occidentem mundi. Quod si inveniatur acus illa, remota a magnete et posita super versorium, statim se applicare ad septentriones et austrum, vel etiam paulatim se eo recipere, tum recipienda est pro causa, præsentia terræ; sin aut vertatur (ut prius) in orientem et occidentem, aut perdat verticitatem, habenda est illa causa pro suspecta, et ulterius inquirendum est.

Similiter, sit natura inquisita Corporea Substantia Lunæ; an sit tenuis, flammea, sive aërea, ut plurimi ex priscis philosophis opinati sunt; an solida et densa, ut Gilbertus et multi moderni, cum nonnullis ex antiquis, tenent.[3] Rationes posterioris istius opinionis fundantur in hoc maxime, quod luna radios solis reflectat; neque videtur fieri reflexio lucis nisi a solidis.

Itaque Instantiæ Crucis circa hoc subjectum eæ esse poterint (si modo aliquæ sint) quæ demonstrent reflexionem a corpore tenui, qualis est flamma, modo sit crassitiei sufficientis. Certe causa crepusculi, inter alias, est reflexio radiorum solis a superiore parte aëris. Etiam quandoque reflecti videmus radios solis temporibus vespertinis serenis a fimbriis nubium roscidarum, non

[1] See, for these two remarks, the twelfth chapter of the third book of Gilbert's treatise *De Magnete*. It is illustrated by a curious woodcut, representing the smith forging a bar of iron, and holding it, as he does so, in the plane of the meridian.

[2] Terrella is a word used by Gilbert to denote a spherical magnet. One of the fundamental ideas of his philosophy was that the earth was a great magnet; and a magnet of the same form was therefore called a *little earth*, or terrella. See, for instance, his treatise *De Magnete*, ii. cc. 7 & 8.

[3] See Gilbert's *De Mundo*, &c., ii. c. 13 *et sqq.*

minori splendore, sed potius illustriori et magis glorioso, quam qui redditur a corpore lunæ[1]; neque tamen constat eas nubes coaluisse in corpus densum aquæ. Etiam videmus aërem tenebrosum pone fenestras noctu reflectere lucem candelæ, non minus quam corpus densum. Tentandum etiam foret experimentum immissionis radiorum solis per foramen super flammam aliquam subfuscam et cæruleam. Sane radii aperti solis, incidentes in flammas obscuriores, videntur eas quasi mortificare, ut conspiciantur magis instar fumi albi quam flammæ. Atque hæc impræsentiarum occurrunt, quæ sint ex natura Instantiarum Crucis circa hanc rem; et meliora fortasse reperiri possunt. Sed notandum semper est, reflexionem a flamma non esse expectandam, nisi a flamma alicujus profunditatis; nam aliter vergit ad diaphanum. Hoc autem pro certo ponendum, lucem semper in corpore æquali aut excipi et transmitti aut resilire.

Similiter, sit natura inquisita Motus Missilium, veluti spiculorum, sagittarum, globulorum, per aërem. Hunc motum Schola (more suo) valde negligenter expedit; satis habens, si eum nomine motus violenti a naturali (quem vocant) distinguat; et quod ad primam percussionem sive impulsionem attinet, per illud, (*quod duo corpora non possint esse in uno loco, ne fiat penetratio dimensionum,*) sibi satisfaciat; et de processu continuato istius motus nihil curet. At circa hanc naturam bivium est tale: aut iste motus fit ab aëre vehente et pone corpus emissum se colligente, instar fluvii erga scapham aut venti erga paleas; aut a partibus ipsius corporis non sustinentibus impressionem, sed ad eandem laxandam per successionem se promoventibus. Atque priorem illum recipit Fracastorius, et fere omnes qui de hoc motu paulo subtilius inquisiverunt[2];

[1] The comparison of the brightness of the moon in the daytime with that of a cloud was ingeniously applied by Bouguer to determine the ratio of the moon's light to the sun's.

[2] See Fracastorius, *De Sympathiâ et Antipathiâ*, c. 4.

The notion that the air concurred in producing the continued motion of projectiles is found in the *Timæus*, p. 80. Plato has been speaking of respiration, of which his theory is, that the expiration of air through the nostrils and mouth pushes the contiguous external air from its place, which disturbs that near it, and so on until a circle is formed, whereby, by antiperistasis, air is forced in through the flesh to fill up the cavity of the chest — a circulation of air through the body, in short. On the same principle he would have explained a variety of other phenomena — the action of cupping instruments, swallowing, the motion of projectiles, &c. &c. All these, however, after suggesting the explanation, he leaves unexplained. But Plutarch, *Quæst. Platon.* x. (p. 177. of Reiske's *Plutarch*) developes a similar explanation in each case. I transcribe what he says of projectiles: — Τὰ δὲ ῥιπτούμενα βάρη τὸν ἀέρα σχίζει μετὰ πληγῆς ἐκπεσόντα, καὶ διίστησιν. ὁ δὲ περιῤῥέων ὄπίσω, τῷ φύσιν ἔχειν ἀεὶ τὴν ἐρημου-

neque dubium est, quin sint aëris partes in hac re nonnullæ; sed alter motus proculdubio verus est, ut ex infinitis constat experimentis. Sed inter cæteras, poterit esse circa hoc subjectum Instantia Crucis talis; quod lamina, aut filum ferri paulo contumacius, vel etiam calamus sive penna in medio divisa, adducta et curvata inter pollicem et digitum, exiliant. Manifestum enim est, hoc non posse imputari aëri se pone corpus colligenti, quia fons motus est in medio laminæ vel calami, non in extremis.

Similiter sit natura inquisita motus ille rapidus et potens Expansionis Pulveris Pyrii in flammam; unde tantæ moles subvertuntur, tanta pondera emittuntur, quanta in cuniculis majoribus et bombardis videmus. Bivium circa hanc naturam tale est. Aut excitatur iste motus a mero corporis appetitu se dilatandi, postquam fuerit inflammatum; aut ab appetitu mixto spiritus crudi, qui rapide fugit ignem, et ex eo circumfuso, tanquam ex carcere, violenter erumpit. Schola autem et vulgaris opinio tantum versatur circa priorem illum appetitum. Putant enim homines se pulchre philosophari, si asserant flammam ex forma elementi necessitate quadam donari locum ampliorem occupandi quam idem corpus expleverat cum subiret formam pulveris, atque inde sequi motum istum. Interim minime advertunt, licet hoc verum sit, posito quod flamma generetur, tamen posse impediri flammæ generationem a tanta mole quæ illam comprimere et suffocare queat; ut non deducatur res ad istam necessitatem de qua loquuntur. Nam quod necesse sit fieri expansionem, atque inde sequi emissionem aut remotionem corporis quod obstat, si generetur flamma, recte putant. Sed ista necessitas plane evitatur, si moles illa solida flammam supprimat antequam generetur. Atque videmus flammam, præsertim in prima generatione, mollem esse et lenem, et requirere cavum in quo experiri et ludere possit. Itaque tanta violentia huic rei per se assignari non potest. Sed illud verum; generationem hujusmodi flammarum flatulentarum, et veluti ventorum igneorum, fieri ex conflictu duorum corporum, eorumque naturæ inter se plane contrariæ; alterius admodum inflammabilis, quæ natura viget in sulphure; alterius flammam exhorrentis, qualis est spiritus crudus qui est in nitro;

μένην χώραν διώκειν καὶ ἀναπληροῦν, συνέπεται τῷ ἀφιεμένῳ, τὴν κίνησιν συνεπιταχύνων. But this explanation is not Plato's, but Plutarch's; though it is probably what Plato would himself have said.

adeo ut fiat conflictus mirabilis, inflammante se sulphure quantum potest (nam tertium corpus, nimirum carbo salicis, nil aliud fere præstat quam ut illa duo corpora incorporet et commode uniat), et erumpente spiritu nitri quantum potest, et una se dilatante (nam hoc faciunt et aër, et omnia cruda, et aqua, ut a calore dilatentur), et per istam fugam et eruptionem interim flammam sulphuris, tanquam follibus occultis, undequaque exufflante.

Poterant autem esse Instantiæ Crucis circa hoc subjectum duorum generum. Alterum eorum corporum quæ maxime sunt inflammabilia, qualia sunt sulphur, caphura, naphtha, et hujusmodi, cum eorum misturis; quæ citius et facilius concipiunt flammam quam pulvis pyrius, si non impediantur; ex quo liquet appetitum inflammandi per se effectum illum stupendum non operari. Alterum eorum quæ flammam fugiunt et exhorrent, qualia sunt sales omnes. Videmus enim, si jaciantur in ignem, spiritum aqueum erumpere cum fragore antequam flamma concipiatur; quod etiam leniter fit in foliis paulo contumacioribus, parte aquea erumpente antequam oleosa concipiat flammam. Sed maxime cernitur hoc in argento vivo, quod non male dicitur aqua mineralis.[1] Hoc enim, absque inflammatione, per eruptionem et expansionem simplicem vires pulveris pyrii fere adæquat; quod etiam admixtum pulveri pyrio ejus vires multiplicare dicitur.

Similiter sit natura inquisita, Transitoria Natura Flammæ, et extinctio ejus momentanea. Non enim videtur natura flammea hic apud nos figi et consistere, sed singulis quasi momentis generari, et statim extingui. Manifestum enim est, in flammis quæ hic continuantur et durant, istam durationem non esse ejusdem flammæ in individuo, sed fieri per successionem novæ flammæ seriatim generatæ, minime autem manere eandem flammam numero; id quod facile perspicitur ex hoc, quod, substracto alimento sive fomite flammæ, flamma statim pereat. Bivium autem circa hanc naturam tale est. Momentanea ista natura aut fit remittente se causa quæ eam primo genuit, ut in lumine, sonis, et motibus (quos vocant) violentis; aut quod flamma in natura sua possit hic apud nos manere, sed a contrariis naturis circumfusis vim patiatur et destruatur.

[1] It is well known that the expansive force of the vapour of mercury at high temperatures is enormous.

Itaque poterit esse circa hoc subjectum Instantia Crucis talis. Videmus flammas in incendiis majoribus, quam alte in sursum ascendant. Quanto enim basis flammæ est latior, tanto vertex sublimior. Itaque videtur principium extinctionis fieri circa latera, ubi ab aëre flamma comprimitur et male habetur. At meditullia flammæ, quæ aër non contingit sed alia flamma undique circumdat, eadem numero manent, neque extinguuntur donec paulatim angustientur ab aëre per latera circumfuso. Itaque omnis flamma pyramidalis est basi circa fomitem largior, vertice autem (inimicante aëre, nec suppeditante fomite) acutior. At fumus, angustior circa basin, ascendendo dilatatur, et fit tanquam pyramis inversa; quia scilicet aër fumum recipit, flammam (neque enim quispiam somniet aërem esse flammam accensam, cum sint corpora plane heterogenea) comprimit.

Accuratior autem poterit esse Instantia Crucis ad hanc rem accommodata, si res forte manifestari possit per flammas bicolores. Capiatur igitur situla parva ex metallo, et in ea figatur parva candela cerea accensa; ponatur situla in patera, et circumfundatur spiritus vini in modica quantitate, quæ ad labra situlæ non attingat; tum accende spiritum vini. At spiritus ille vini exhibebit flammam magis scilicet cæruleam, lychnus candelæ autem magis flavam. Notetur itaque utrum flamma lychni (quam facile est per colorem a flamma spiritus vini distinguere, neque enim flammæ, ut liquores, statim commiscentur) maneat pyramidalis, an potius magis tendat ad formam globosam, cum nihil inveniatur quod eam destruat aut comprimat.[1] At hoc posterius si fiat, manere flammam eandem numero, quamdiu intra aliam flammam concludatur nec vim inimicam aëris experiatur, pro certo ponendum est.

Atque de Instantiis Crucis hæc dicta sint. Longiores autem in iis tractandis ad hunc finem fuimus, ut homines paulatim discant et assuefiant de natura judicare per Instantias Crucis et experimenta lucifera, et non per rationes probabiles.

XXXVII.

Inter Prærogativas Instantiarum, ponemus loco decimo quinto *Instantias Divortii;* quæ indicant separationes naturarum earum quæ ut plurimum occurrunt. Differunt autem ab Instantiis quæ subjunguntur Instantiis Comitatus; quia illæ indi-

[1] This experiment is mentioned as actually tried in *Syl. Sylvarum*, 31. [See note on the passage. — *J. S.*]

cant separationes naturæ alicujus ab aliquo concreto cum quo illa familiariter consuescit, hæ vero separationes naturæ alicujus ab altera natura. Differunt etiam ab Instantiis Crucis; quia nihil determinant, sed monent tantum de separabilitate unius naturæ ab altera. Usus autem earum est ad prodendas falsas Formas, et dissipandas leves contemplationes ex rebus obviis orientes; adeo ut veluti plumbum et pondera intellectui addant.

Exempli gratia: sint naturæ inquisitæ quatuor naturæ illæ, quas *Contubernales* vult esse Telesius[1], et tanquam ex eadem camera; viz. Calidum, Lucidum, Tenue, Mobile sive promptum ad motum. At plurimæ inveniuntur Instantiæ Divortii inter ipsas. Aër enim tenuis est et habilis ad motum, non calidus aut lucidus; luna lucida, absque calore; aqua fervens calida, absque lumine; motus acus ferreæ super versorium pernix et agilis, et tamen in corpore frigido, denso, opaco; et complura id genus.

Similiter sint naturæ inquisitæ Natura Corporea et Actio Naturalis. Videtur enim non inveniri actio naturalis, nisi subsistens in aliquo corpore. Attamen possit fortasse esse circa hanc rem Instantia nonnulla Divortii. Ea est actio magnetica, per quam ferrum fertur ad magnetem, gravia ad globum terræ. Addi etiam possint aliæ nonnullæ operationes ad distans. Actio siquidem hujusmodi et in tempore fit, per momenta non in puncto temporis, et in loco, per gradus et spatia. Est itaque aliquod momentum temporis, et aliquod intervallum loci, in quibus ista virtus sive actio hæret in medio inter duo illa corpora quæ motum cient. Reducitur itaque contemplatio ad hoc; utrum illa corpora quæ sunt termini motus disponant vel alterent corpora media, ut per successionem et tactum verum labatur virtus a termino ad terminum, et interim subsistat in corpore medio; an horum nihil sit, præter corpora et virtutem et spatia? Atque in radiis opticis et sonis et calore et aliis nonnullis operantibus ad distans, probabile est media corpora

[1] The fundamental idea of Telesius's philosophy is, that heat and cold are the great constituent principles of the universe, and that the antithesis between them corresponds to that which he recognises between the sun and the earth: — "Omnino calidus, tenuis, candidus, mobilisque est Sol; Terra contra frigida, crassa, immobilis, tenebricosaque .... unum Sol in terram emittens calorem ejus naturam facultatesque et conditiones ex eâ deturbat omnes, suasque ei indit; et eodem ferme modo quo Sol terram, etiam calor quivis, vel qui e commotis contritisque enascitur rebus, quæ corripit exuperatque immutare videtur; frigus scilicet ex iis, ejusque facultates conditionesque omnes, crassitiem, obscuritatem, immobilitatem, deturbare, et se ipsum iis, propriasque facultates conditionesque omnes, tenuitatem, albedinem et mobilitatem, indere ..... videtur." — *De Rerum Naturâ*, l. c. 1.

disponi et alterari; eo magis, quod requiratur medium qualificatum ad deferendam operationem talem. At magnetica illa sive coitiva virtus admittit media tanquam adiaphora, nec impeditur virtus in omnigeno medio. Quod si nil rei habeat virtus illa aut actio cum corpore medio, sequitur quod sit virtus aut actio naturalis ad tempus nonnullum et in loco nonnullo subsistens sine corpore; cum neque subsistat in corporibus terminantibus, nec in mediis. Quare actio magnetica poterit esse Instantia Divortii circa naturam corpoream et actionem naturalem. Cui hoc adjici potest tanquam corollarium aut lucrum non prætermittendum: viz. quod etiam secundum sensum philosophanti sumi possit probatio [1] quod sint entia et substantiæ separatæ et incorporeæ. Si enim virtus et actio naturalis, emanans a corpore, subsistere possit aliquo tempore et aliquo loco omnino sine corpore; prope est ut possit etiam emanare in origine sua a substantia incorporea. Videtur enim non minus requiri natura corporea ad actionem naturalem sustentandam et devehendam, quam ad excitandam aut generandam.

XXXVIII.

Sequuntur quinque ordines instantiarum, quas uno vocabulo generali *Instantias Lampadis* sive *Informationis Primæ* appellare consuevimus. Eæ sunt quæ auxiliantur sensui. Cum enim omnis Interpretatio Naturæ incipiat a sensu, atque a sensuum perceptionibus recta, constanti, et munita via ducat ad perceptiones intellectus, quæ sunt notiones veræ et axiomata, necesse est ut quanto magis copiosæ et exactæ fuerint repræsentationes sive præbitiones ipsius sensus, tanto omnia cedant facilius et fœlicius.

Harum autem quinque Instantiarum Lampadis, primæ roborant, ampliant, et rectificant actiones sensus immediatas: secundæ deducunt non-sensibile ad sensibile [2]; tertiæ indicant processus continuatos sive series earum rerum et motuum quæ (ut plurimum) non notantur nisi in exitu aut periodis; quartæ aliquid substituunt sensui in meris destitutionibus; quintæ excitant attentionem sensus et advertentiam, atque una limitant subtilitatem rerum. De his autem singulis jam dicendum est.

XXXIX.

Inter Prærogativas Instantiarum, ponemus loco decimo sexto

[1] *i. e.* a proof furnished by merely human philosophy.

[2] *i. e.* make manifest things which are not directly perceptible, by means of others which are.

Instantias Januæ sive *Portæ:* eo enim nomine eas appellamus quæ juvant actiones sensus immediatas. Inter sensus autem manifestum est partes primas tenere Visum, quoad informationem; quare huic sensui præcipue auxilia conquirenda. Auxilia autem triplicia esse posse videntur; vel ut percipiat non visa; vel ut majore intervallo; vel ut exactius et distinctius.

Primi generis sunt (missis bis-oculis et hujusmodi, quæ valent tantum ad corrigendam et levandam infirmitatem visus non bene dispositi, atque ideo nihil amplius informant) ea quæ nuper inventa sunt perspicilla; quæ latentes et invisibiles corporum minutias, et occultos schematismos et motus (aucta insigniter specierum magnitudine) demonstrant; quorum vi, in pulice, musca, vermiculis, accurata corporis figura et lineamenta, necnon colores et motus prius non conspicui, non sine admiratione cernuntur. Quinetiam aiunt[1] lineam rectam calamo vel penecillo descriptam, per hujusmodi perspicilla inæqualem admodum et tortuosam cerni; quia scilicet nec motus manus, licet per regulam adjutæ, nec impressio atramenti aut coloris revera æqualia existant; licet illæ inæqualitates tam minutæ sint ut sine adjumento hujusmodi perspicillorum conspici nequeant. Etiam superstitiosam quandam observationem in hac re (ut fit in rebus novis et miris) addiderunt homines: viz. quod hujusmodi perspicilla opera naturæ illustrent, artis dehonestent. Illud vero nihil aliud est quam quod texturæ naturales multo subtiliores sint quam artificiosæ.[2] Perspicillum enim illud ad minuta tantum valet: quale perspicillum si vidisset Democritus, exiluisset forte, et modum videndi atomum (quem ille invisibilem omnino affirmavit) inventum fuisse putasset.[3] Verum incompetentia hujusmodi perspicillorum, præterquam ad minutias tantum (neque ad ipsas quoque, si fuerint in corpore majusculo), usum rei destruit. Si enim inventum extendi posset ad corpora majora, aut corporum majorum minutias, adeo ut textura panni

[1] Compare *Aph.* xiii. § 28. "Specula comburentia, in quibus (*ut memini*) hoc fit," &c. It would appear from the passage in the text that Bacon had not even seen one of the newly invented microscopes.—*J. S.*

[2] Leibnitz goes as for as to say, "La matière arrangée par une sagesse divine doit être essentiellement organisée partout; . . . il y a machine dans les parties de la machine naturelle à l'infini."—*Sur le Principe de Vie*, p. 431. of Erdmann's edition.

[3] Democritus maintained that the atom was wholly incognisable by the senses. Thus Sextus Empiricus mentions him along with Plato as having held the doctrine *μόνα τὰ νοητὰ ἀληθῆ εἶναι*; the reason in the case of Democritus being that his atoms, which alone he recognised as realities, possessed *πάσης αἰσθητῆς ποιότητος ἔρημον φύσιν.*—*Sext. Em. Advers. Logicos*, ii. § 6.

lintei conspici posset tanquam rete, atque hoc modo minutiæ latentes et inæqualitates gemmarum, liquorum, urinarum, sanguinis, vulnerum, et multarum aliarum rerum, cerni possent, magnæ proculdubio ex eo invento commoditates capi possent.

Secundi generis sunt illa altera perspicilla quæ memorabili conatu adinvenit Galilæus; quorum ope, tanquam per scaphas aut naviculas, aperiri et exerceri possint propiora cum cœlestibus commercia. Hinc enim constat, galaxiam esse nodum sive coacervationem stellarum parvarum, plane numeratarum et distinctarum; de qua re apud antiquos tantum suspicio fuit. Hinc demonstrari videtur, quod spatia orbium (quos vocant) planetarum non sint plane vacua aliis stellis, sed quod cœlum incipiat stellescere antequam ad cœlum ipsum stellatum ventum sit; licet stellis minoribus quam ut sine perspicillis istis conspici possint. Hinc choreas illas stellarum parvarum circa planetam Jovis (unde conjici possit esse in motibus stellarum plura centra) intueri licet. Hinc inæqualitates luminosi et opaci in luna distinctius cernuntur et locantur; adeo ut fieri possit quædam seleno-graphia. Hinc maculæ in sole, et id genus: omnia certe inventa nobilia, quatenus fides hujusmodi demonstrationibus tuto adhiberi possit.[1] Quæ nobis ob hoc maxime suspectæ sunt, quod in istis paucis sistatur experimentum, neque alia complura investigatu æque digna eadem ratione inventa sint.[2]

[1] Galileo often mentions the attempt which many of the Peripaticians made to set aside all arguments founded on his discoveries with the telescope, by saying that they were mere optical delusions. J. C. La Galla, in his dissertation *De Phænominis in Orbe Lunæ*, has a section entitled "De Telescopii Veritate," in which, though an Aristotelian, he has nevertheless admitted that this objection is untenable.

[2] Compare this with the passage in the *Descriptio Globi Intellectualis* (c. v.) where Bacon speaks of Galileo's invention and discoveries (the firstfruits of which had just been announced) in a strain of more sanguine expectation: — "Atque hoc inceptum et fine et aggressu nobile quoddam et humano genere dignum esse existimamus: eo magis quod hujusmodi homines et ausu laudandi sint et fide; quod ingenue et perspicue proposuerunt, quomodo singula illis constiterint. Superest tantum constantia, cum magnâ judicii severitate, ut et instrumenta mutent, et testium numerum augeant, et singula et sæpe experiantur, et varie; denique ut et sibi ipsi objiciant et aliis patefaciant quid in contrarium objici possit, et tenuissimum quemque scrupulum non spernant; ne forte illis eveniat, quod Democriti et aniculæ suæ evenit circa ficus mellitas, ut vetula esset philosopho prudentior, et magnæ et admirabilis speculationis causæ subesset error quispiam tenuis et ridiculus." From this passage, written eight years before, we may learn (I think) why it was that Bacon had now begun to doubt how far these observations could be trusted. Believing, as he did, that all the received theories of the heavens were full of error, as soon as he heard that by means of the telescope men could really see so much further into the heavens than before, he was prepared to hear of a great number of new and unexpected phenomena; and his only fear was that the observers, instead of following out their observations patiently and carefully, would begin to form new theories. But now that nine years had passed since the discovery of Jupiter's satellites, the spots in the sun, &c., and no new discovery of importance had been announced, he wondered how it could be that men

Tertii generis sunt bacilla illa ad terras mensurandas, astrolabia, et similia; quæ sensum videndi non ampliant, sed rectificant et dirigunt. Quod si sint aliæ instantiæ quæ reliquos sensus juvent in ipsorum actionibus immediatis et individuis, tamen si ejusmodi sint quæ informationi ipsi nihil addant plus quam jam habetur, ad id quod nunc agitur non faciunt. Itaque earum mentionem non fecimus.

XL.

Inter Prærogativas Instantiarum, ponemus loco decimo septimo *Instantias Citantes*, sumpto vocabulo a foris civilibus, quia citant ea ut compareant quæ prius non comparuerunt; quas etiam *Instantias Evocantes* appellare consuevimus. Eæ deducunt non-sensibile ad sensibile.

Sensum autem fugiunt res, vel propter distantiam objecti locati; vel propter interceptionem sensus per corpora media; vel quia objectum non est habile ad impressionem in sensu faciendam; vel quia deficit quantum in objecto pro feriendo sensu; vel quia tempus non est proportionatum ad actuandum sensum; vel quia objecti percussio non toleratur a sensu; vel quia objectum ante implevit et possedit sensum, ut novo motui non sit locus. Atque hæc præcipue ad visum pertinent, et deinde ad tactum. Nam hi duo sensus sunt informativi ad largum, atque de communibus objectis; ubi reliqui tres non informent fere nisi immediate et de propriis objectis.

In primo genere non fit deductio ad sensibile, nisi rei quæ cerni non possit propter distantiam adjiciatur aut substituatur alia res quæ sensum magis e longinquo provocare et ferire possit: veluti in significatione rerum per ignes, campanas, et similia.

In secundo genere fit deductio, cum ea quæ interius propter interpositionem corporum latent, nec commode aperiri possunt, per ea quæ sunt in superficie, aut ab interioribus effluunt, perducuntur ad sensum: ut status humanorum corporum per pulsus, et urinas, et similia.

At tertii et quarti generis deductiones ad plurima spectant, atque undique in rerum inquisitione sunt conquirendæ. Hujus rei exempla sunt. Patet quod aër, et spiritus, et hujusmodi res quæ sunt toto corpore tenues et subtiles, nec cerni nec tangi

seeing so much further should be able to see so little more than they did, and began to suspect that it was owing to some defect either in the instrument or in the methods of observation. — *J. S.*

possint. Quare in inquisitione circa hujusmodi corpora deductionibus omnino est opus.

Sit itaque natura inquisita Actio et Motus Spiritus qui includitur in corporibus tangibilibus. Omne enim tangibile apud nos continet spiritum invisibilem et intactilem, eique obducitur atque eum quasi vestit. Hinc fons triplex potens ille et mirabilis processus spiritus in corpore tangibili. Spiritus enim in re tangibili, emissus, corpora contrahit et desiccat; detentus, corpora intenerat et colliquat; nec prorsus emissus nec prorsus detentus, informat, membrificat, assimilat, egerit, organizat, et similia. Atque hæc omnia deducuntur ad sensibile per effectus conspicuos.

Etenim in omni corpore tangibili inanimato, spiritus inclusus primo multiplicat se, et tanquam depascit partes tangibiles eas quæ sunt maxime ad hoc faciles et præparatæ, easque digerit et conficit et vertit in spiritum, et deinde una evolant. Atque hæc confectio et multiplicatio spiritus deducitur ad sensum per diminutionem ponderis. In omni enim dessicatione, aliquid defluit de quanto; neque id ipsum ex spiritu tantum præinexistente, sed ex corpore quod prius fuit tangibile et noviter versum est: spiritus enim non ponderat. Egressus autem sive emissio spiritus deducitur ad sensibile in rubigine metallorum, et aliis putrefactionibus ejus generis quæ sistunt se antequam pervenerint ad rudimenta vitæ; nam illa[1] ad tertium genus processus pertinent. Etenim in corporibus magis compactis spiritus non invenit poros et meatus per quos evolet; itaque cogitur partes ipsas tangibiles protrudere et ante se agere, ita ut illæ simul exeant; atque inde fit rubigo, et similia. At contractio partium tangibilium, postquam aliquid de spiritu fuerit emissum (unde sequitur illa desiccatio), deducitur ad sensibile tum per ipsam duritiem rei auctam, tum multo magis per scissuras, angustiationes, corrugationes, et complicationes corporum, quæ inde sequuntur. Etenim partes ligni desiliunt et angustiantur; pelles corrugantur; neque id solum, sed (si subita fuerit emissio spiritus per calorem ignis) tantum properant ad contractionem ut se complicent et convolvant.

At contra, ubi spiritus detinetur, et tamen dilatatur et excitatur per calorem aut ejus analoga (id quod fit in corporibus magis solidis aut tenacibus), tum vero corpora emolliuntur, ut ferrum candens; fluunt, ut metalla; liquefiunt, ut gummi, cera,

[1] "Illæ" in the original edition, which must be wrong.

et similia. Itaque contrariæ illæ operationes caloris (ut ex eo alia durescant, alia liquescant) facile conciliantur; quia in illis spiritus emittitur, in his agitatur et detinetur: quorum posterius est actio propria caloris et spiritus; prius, actio partium tangibilium tantum per occasionem spiritus emissi.

Ast ubi spiritus nec detinetur prorsus nec prorsus emittitur, sed tantum inter claustra sua tentat et experitur, atque nacta est partes tangibiles obedientes et sequaces in promptu, ita ut quo spiritus agit eæ simul sequantur; tum vero sequitur efformatio in corpus organicum, et membrificatio, et reliquæ actiones vitales, tam in vegetabilibus quam in animalibus. Atque hæc maxime deducuntur ad sensum per notationes diligentes primorum incœptuum et rudimentorum sive tentamentorum vitæ in animalculis ex putrefactione natis: ut in ovis formicarum, vermibus, muscis, ranis post imbrem, etc. Requiritur autem ad vivificationem et lenitas caloris et lentor corporis; ut spiritus nec per festinationem erumpat, nec per contumaciam partium coerceatur; quin potius ad ceræ modum illas plicare et effingere possit.

Rursus, differentia illa spiritus, maxime nobilis et ad plurima pertinens, (viz. spiritus abscissi, ramosi simpliciter, ramosi simul et cellulati; ex quibus prior est spiritus omnium corporum inanimatorum, secundus vegetabilium, tertius animalium), per plurimas instantias deductorias tanquam sub oculos ponitur.

Similiter patet, quod subtiliores texturæ et schematismi rerum (licet toto corpore visibilium aut tangibilium) nec cernantur nec tangantur. Quare in his quoque per deductionem procedit informatio. At differentia schematismorum maxime radicalis et primaria sumitur ex copia vel paucitate materiæ quæ subit idem spatium sive dimensum. Reliqui enim schematismi (qui referuntur ad dissimilaritates partium quæ in eodem corpore continentur, et collocationes ac posituras earundem) præ illo altero sunt secundarii.

Sit itaque natura inquisita Expansio sive Coitio Materiæ in corporibus respective: viz. quantum materiæ impleat quantum dimensum in singulis. Etenim nil verius in natura quam propositio illa gemella, *ex nihilo nihil fieri*, neque *quicquam in nihilum redigi*; verum quantum ipsum materiæ sive summam totalem constare, nec augeri aut minui.[1] Nec illud minus

[1] It is worth remarking that Bacon here asserts as absolutely certain a maxim which

verum, *ex quanto illo materiæ sub iisdem spatiis sive dimensionibus, pro diversitate corporum, plus et minus contineri;* ut in aqua plus, in aëre minus; adeo ut si quis asserat aliquod contentum aquæ in par contentum aëris verti posse, idem sit ac si dicat aliquid posse redigi in nihilum; contra, si quis asserat aliquod contentum aëris in par contentum aquæ verti posse, idem sit ac si dicat aliquid posse fieri ex nihilo. Atque ex copia ista et paucitate materiæ notiones illæ Densi et Rari, quæ varie et promiscue accipiuntur, proprie abstrahuntur. Assumenda est et assertio illa tertia, etiam satis certa: quod hoc de quo loquimur plus et minus materiæ in corpore hoc vel illo ad calculos (facta collatione) et proportiones exactas aut exactis propinquas reduci possit. Veluti si quis dicat inesse in dato contento auri talem coacervationem materiæ, ut opus habeat spiritus vini, ad tale quantum materiæ æquandum, spatio vicies et semel majore quam implet aurum, non erraverit.

Coacervatio autem materiæ et rationes ejus deducuntur ad sensibile per pondus. Pondus enim respondet copiæ materiæ, quoad partes rei tangibilis; spiritus autem, et ejus quantum ex materia, non venit in computationem per pondus; levat enim pondus potius quam gravat. At nos hujus rei tabulam fecimus satis accuratam; in qua pondera et spatia singulorum metallorum, lapidum præcipuorum, lignorum, liquorum, oleorum, et plurimorum aliorum corporum tam naturalium quam artificialium, excepimus[1]; rem polychrestam, tam ad lucem informationis quam ad normam operationis; et quæ multas res revelet omnino præter expectatum. Neque illud pro minimo habendum est, quod demonstret omnem varietatem quæ in corporibus tangibilibus nobis notis versatur (intelligimus autem corpora bene unita, nec plane spongiosa et cava et magna ex parte aëre impleta) non ultra rationes partium 21 excedere: tam finita scilicet est natura, aut saltem illa pars ejus cujus usus ad nos maxime pertinet.

Etiam diligentiæ nostræ esse putavimus, experiri si forte capi possint rationes corporum non-tangibilium sive pneumaticorum, respectu corporum tangibilium. Id quod tali molitione aggressi sumus. Phialam vitream accepimus, quæ unciam fortasse unam capere possit; parvitate vasis usi, ut minori cum calore

is assuredly no result of experience. The same doctrine is as distinctly, though not so emphatically, asserted by Telesius, l. c. 5.

[1] For a full account of the methods of determining specific gravities employed respectively by Porta, Ghetaldo, and Bacon, see preface to *Historia Densi et Rari.*—*J. S.*

posset fieri evaporatio sequens. Hanc phialam spiritu vini implevimus fere ad collum; eligentes spiritum vini, quod per tabulam priorem eum esse ex corporibus tangibilibus (quæ bene unita, nec cava sunt) rarissimum, et minimum continens materiæ sub suo dimenso, observarimus. Deinde pondus aquæ cum phiala ipsa exacte notavimus. Postea vesicam accepimus, quæ circa duas pintas contineret. Ex ea aërem omnem, quoad fieri potuit, expressimus eo usque ut vesicæ ambo latera essent contigua: etiam prius vesicam oleo oblevimus cum fricatione leni, quo vesica esset clausior: ejus, si qua erat, porositate oleo obturata. Hanc vesicam circa os phialæ, ore phialæ intra os vesicæ recepto, fortiter ligavimus; filo parum cerato, ut melius adhæresceret et arctius ligaret. Tum demum phialam supra carbones ardentes in foculo collocavimus. At paulo post vapor sive aura spiritus vini, per calorem dilatati et in pneumaticum versi, vesicam paulatim sufflavit, eamque universam veli instar undequaque extendit. Id postquam factum fuit, continuo vitrum ab igne removimus, et super tapetem posuimus ne frigore disrumperetur; statim quoque in summitate vesicæ foramen fecimus, ne vapor cessante calore in liquorem restitutus resideret, et rationes confunderet. Tum vero vesicam ipsam sustulimus, et rursus pondus excepimus spiritus vini qui remanebat. Inde quantum consumptum fuisset in vaporem seu pneumaticum computavimus; et facta collatione quantum locum sive spatium illud corpus implesset quando esset spiritus vini in phiala, et rursus quantum spatium impleverit postquam factum fuisset pneumaticum in vesica, rationes subduximus; ex quibus manifeste liquebat, corpus istud ita versum et mutatum expansionem centuplo majorem quam antea habuisset acquisivisse.

Similiter sit natura inquisita Calor aut Frigus; ejus nempe gradus, ut a sensu non percipiantur ob debilitatem. Hæc deducuntur ad sensum per vitrum calendare, quale superius descripsimus. Calor enim et frigus, ipsa non percipiuntur ad tactum; at calor aërem expandit, frigus contrahit. Neque rursus illa expansio et contractio aëris percipitur ad visum; at aër ille expansus aquam deprimit, contractus attollit; ac tum demum fit deductio ad visum, non ante, aut alias.

Similiter sit natura inquisita Mistura Corporum; viz. quid habeant ex aqueo, quid ex oleoso, quid ex spiritu, quid ex cinere et salibus, et hujusmodi; vel etiam (in particulari) quid habeat

lac butyri, quid coaguli, quid seri, et hujusmodi. Hæc deducuntur ad sensum per artificiosas et peritas separationes, quatenus ad tangibilia. At natura spiritus in ipsis, licet immediate non percipiatur, tamen deprehenditur per varios motus et nixus corporum tangibilium in ipso actu et processu separationis suæ; atque etiam per acrimonias, corrosiones, et diversos colores, odores, et sapores eorundem corporum post separationem. Atque in hac parte, per distillationes atque artificiosas separationes, strenue sane ab hominibus elaboratum est; sed non multo fœlicius quam in cæteris experimentis, quæ adhuc in usu sunt: modis nimirum prorsus palpatoriis, et viis cæcis, et magis operose quam intelligenter; et (quod pessimum est) nulla cum imitatione aut æmulatione naturæ, sed cum destructione (per calores vehementes aut virtutes nimis validas) omnis subtilioris schematismi, in quo occultæ rerum virtutes et consensus præcipue sitæ sunt. Neque illud etiam, quod alias monuimus, hominibus in mentem aut observationem venire solet in hujusmodi separationibus: hoc est, plurimas qualitates, in corporum vexationibus tam per ignem quam alios modos, indi ab ipso igne iisque corporibus quæ ad separationem adhibentur, quæ in composito prius non fuerunt; unde miræ fallaciæ. Neque enim scilicet vapor universus, qui ex aqua emittitur per ignem, vapor aut aër antea fuit in corpore aquæ; sed factus est maxima ex parte per dilatationem aquæ ex calore ignis.

Similiter in genere omnes exquisitæ probationes corporum sive naturalium sive artificialium, per quas vera dignoscuntur ab adulterinis, meliora a vilioribus, huc referri debent: deducunt enim non-sensibile ad sensibile. Sunt itaque diligenti cura undique conquirendæ.

Quintum vero genus latitantiæ quod attinet, manifestum est actionem sensus transigi in motu, motum in tempore. Si igitur motus alicujus corporis sit vel tam tardus vel tam velox ut non sit proportionatus ad momenta in quibus transigitur actio sensus, objectum omnino non percipitur; ut in motu indicis horologii, et rursus in motu pilæ sclopeti. Atque motus qui ob tarditatem non percipitur, facile et ordinario deducitur ad sensum per summas motus; qui vero ob velocitatem, adhuc non bene mensurari consuevit; sed tamen postulat inquisitio naturæ ut hoc fiat in aliquibus.

Sextum autem genus, ubi impeditur sensus propter nobilitatem objecti, recipit deductionem, vel per elongationem majorem

objecti a sensu; vel per hebetationem objecti per interpositionem medii talis, quod objectum debilitet, non annihilet; vel per admissionem et exceptionem objecti reflexi, ubi percussio directa sit nimis fortis; ut solis in pelvi aquæ.

Septimum autem genus latitantiæ, ubi sensus ita oneratur objecto ut novæ admissioni non sit locus, non habet fere locum nisi in olfactu et odoribus; nec ad id quod agitur multum pertinet. Quare de deductionibus non-sensibilis ad sensibile, hæc dicta sint.[1]

Quandoque tamen deductio fit non ad sensum hominis, sed ad sensum alicujus alterius animalis cujus sensus in aliquibus humanum excellet: ut nonnullorum odorum, ad sensum canis; lucis, quæ in aëre non extrinsecus illuminato latenter existit, ad sensum felis, noctuæ, et hujusmodi animalium quæ cernunt noctu. Recte enim notavit Telesius, etiam in aëre ipso inesse lucem quandam originalem, licet exilem et tenuem, et maxima ex parte oculis hominum aut plurimorum animalium non inservientem; quia illa animalia, ad quorum sensum hujusmodi lux est proportionata, cernant noctu; id quod vel sine luce fieri, vel per lucem internam, minus credibile est.

Atque illud utique notandum est, de destitutionibus sensuum eorumque remediis hic nos tractare. Nam fallaciæ sensuum ad proprias inquisitiones de sensu et sensibili remittendæ sunt; excepta illa magna fallacia sensuum, nimirum quod constituant lineas rerum[2] ex analogia hominis, et non ex analogia universi; quæ non corrigitur nisi per rationem et philosophiam universalem.

XLI.

Inter Prærogativas Instantiarum, ponemus loco decimo octavo *Instantias Viæ*, quas etiam *Instantias Itinerantes* et *Instantias Articulatas* appellare consuevimus. Eæ sunt quæ indicant naturæ motus gradatim continuatos. Hoc autem genus

[1] An excellent instance of the "deductio nonsensibilis ad sensibile" [in the second kind] occurs in the experiments recently made by Messrs. Hopkins and Joule for determining the melting-point of substances subjected to great pressure. The substance acted on is enclosed in a tube out of reach and sight. But a bit of magnetized steel has previously been introduced into it, and is supported by it as long as it remains solid. A magnetic needle is placed beside the apparatus, a certain amount of deviation being, of course, produced by the steel within the tube. The moment the temperature reaches the melting-point, the steel sinks; and its doing so is indicated by the motion of the needle.

[2] This phrase may, I think, be rendered "trace the outlines of outward objects." I have already remarked on the meaning of "ex analogiâ." [See note on *Distributio Operis*, p. 138.—*J. S.*]

instantiarum potius fugit observationem quam sensum. Mira enim est hominum circa hanc rem indiligentia. Contemplantur siquidem naturam tantummodo desultorie et per periodos, et postquam corpora fuerint absoluta ac completa, et non in operatione sua. Quod si artificis alicujus ingenia et industriam explorare et contemplari quis cuperet, is non tantum materias rudes artis atque deinde opera perfecta conspicere desideraret, sed potius præsens esse cum artifex operatur et opus suum promovet. Atque simile quiddam circa naturam faciendum est. Exempli gratia; si quis de vegetatione plantarum inquirat, ei inspiciendum est ab ipsa satione seminis alicujus (id quod per extractionem, quasi singulis diebus, seminum quæ per biduum, triduum, quatriduum, et sic deinceps, in terra manserunt, eorumque diligentem intuitum, facile fieri potest), quomodo et quando semen intumescere et turgere incipiat et veluti spiritu impleri; deinde quomodo corticulam rumpere et emittere fibras, cum latione nonnulla sui interim sursum, nisi terra fuerit admodum contumax; quomodo etiam emittat fibras, partim radicales deorsum, partim cauliculares sursum, aliquando serpendo per latera, si ex ea parte inveniat terram apertam et magis facilem; et complura id genus. Similiter facere oportet circa exclusionem ovorum; ubi facile conspici dabitur processus vivificandi et organizandi, et quid et quæ partes fiant ex vitello, quid ex albumine ovi, et alia. Similis est ratio circa animalia ex putrefactione.[1] Nam circa animalia perfecta et terrestria, per exectiones fœtuum ex utero, minus humanum esset ista inquirere; nisi forte per occasiones abortuum, et venationum, et similium. Omnino igitur vigilia quædam servanda est circa naturam, ut quæ melius se conspiciendam præbeat noctu quam interdiu. Istæ enim contemplationes tanquam nocturnæ censeri possint, ob lucernæ parvitatem et perpetuationem.

Quin et in inanimatis idem tentandum est; id quod nos

[1] The epithet perfecta is generally given to those animals which cannot result from putrefaction. Cæsalpinus, in the *Quæstiones Peripat.* v. 1., maintains that all animals may result from putrefaction, and that this was the doctrine of Aristotle. The same opinion had, I believe, been advanced by Averrois. That mice may be produced by equivocal generation is asserted, as a matter not admitting of dispute, by Cardan, *De Rerum Varietate.* Cæsalpinus refers to the same instance, but less confidently than Cardan. It is worth remarking that Aristotle, though he speaks of the great fecundity of mice, and even of their being impregnated by licking salt, does not mention the possibility of their being produced by putrefaction. (*De Hist. Animal.* vi. 37. *Problem.* x. 64.) Paracelsus, *De Rerum Generatione,* affirms that all animals produced from putrefaction are more or less venomous. Telesius's opinion is that the more perfect animals cannot result from putrefaction, because the conditions of temperature necessary to their production cannot be fulfilled except by means of animal heat.

fecimus in inquirendis aperturis liquorum per ignem.[1] Alius enim est modus aperturæ in aqua, alius in vino, alius in aceto, alius in omphacio[2]; longe alius in lacte, et oleo, et cæteris. Id quod facile cernere erat per ebullitionem super ignem lenem, et in vase vitreo, ubi omnia cerni perspicue possint. Verum hæc brevius perstringimus, fusius et exactius de iis sermones habituri cum ad inventionem *Latentis* rerum *Processus* ventum erit. Semper enim memoria tenendum est, nos hoc loco non res ipsas tractare, sed exempla tantum adducere.

XLII.

Inter Prærogativas Instantiarum, ponemus loco decimo nono *Instantias Supplementi*, sive *Substitutionis;* quas etiam *Instantias Perfugii* appellare consuevimus. Eæ sunt, quæ supplent informationem ubi sensus plane destituitur; atque idcirco ad eas confugimus cum instantiæ propriæ haberi non possint. Dupliciter autem fit substitutio; aut per Graduationem, aut per Analoga. Exempli gratia; non invenitur medium quod inhibeat prorsus operationem magnetis in movendo ferrum; non aurum interpositum, non argentum, non lapis, non vitrum, lignum, aqua, oleum, pannus aut corpora fibrosa, aër, flamma, et cætera. Attamen per probationem exactam fortasse inveniri possit aliquod medium quod hebetet virtutem ipsius plus quam aliquod aliud, comparative et in aliquo gradu; veluti quod non trahat magnes ferrum per tantam crassitiem auri quam per par spatium aëris; aut per tantum argentum ignitum quam per frigidum; et sic de similibus. Nam de his nos experimentum non fecimus; sed sufficit tamen ut proponantur loco exempli. Similiter non invenitur hic apud nos corpus quod non suscipiat calidum igni approximatum. Attamen longe citius suscipit calorem aër quam lapis. Atque talis est substitutio quæ fit per Gradus.

Substitutio autem per Analoga, utilis sane, sed minus certa est; atque idcirco cum judicio quodam adhibenda. Ea fit cum deducitur non-sensibile ad sensum, non per operationes sensibiles ipsius corporis insensibilis, sed per contemplationem corporis alicujus cognati sensibilis.[3] Exempli gratia; si in-

[1] "Apertura" means the same thing as "expansio."

[2] Wine made of sour grapes. (*Pliny*, xiv. 18. and elsewhere.) It is probably to be rendered verjuice, as it is by Lemmius.

[3] Du Bois Raymond's *Researches in Animal Electricity* give a good example of this. He constructed what may called an electrical model of a muscle, and succeeded in obtaining an illustration not only of his fundamental result, namely that any transverse

quiratur de Mistura Spirituum, qui sunt corpora non-visibilia, videtur esse cognatio quædam inter corpora et fomites sive alimenta sua. Fomes autem flammæ videtur esse oleum et pinguia; aëris, aqua et aquea: flammæ enim multiplicant se super halitus olei, aër super vapores aquæ. Videndum itaque de mistura aquæ et olei, quæ se manifestat ad sensum; quandoquidem mistura aëris et flammei generis fugiat sensum. At oleum et aqua inter se per compositionem aut agitationem imperfecte admodum miscentur; eadem in herbis, et sanguine, et partibus animalium, accurate et delicate miscentur. Itaque simile quiddam fieri possit circa misturam flammei et aërei generis in spiritalibus; quæ per confusionem simplicem non bene sustinent misturam, eadem tamen in spiritibus plantarum et animalium misceri videntur; præsertim cum omnis spiritus animatus depascat humida utraque, aquea et pinguia, tanquam fomites suos.

Similiter si non de perfectioribus misturis spiritalium, sed de compositione tantum inquiratur; nempe, utrum facile inter se incorporentur, an potius (exempli gratia) sint aliqui venti et exhalationes, aut alia corpora spiritalia, quæ non miscentur cum aëre communi, sed tantum hærent et natant in eo, in globulis et guttis, et potius franguntur ac comminuuntur ab aëre quam in ipsum recipiuntur et incorporantur; hoc in aëre communi et aliis spiritalibus, ob subtilitatem corporum, percipi ad sensum non potest; attamen imago quædam hujus rei, quatenus fiat, concipi possit in liquoribus argenti vivi, olei, aquæ; atque etiam in aëre, et fractione ejus, quando dissipatur et ascendit in parvis portiunculis per aquam; atque etiam in fumis crassioribus; denique in pulvere excitato et hærente in aëre; in quibus omnibus non fit incorporatio. Atque repræsentatio prædicta in hoc subjecto non mala est, si illud primo diligenter inquisitum fuerit, utrum possit esse talis heterogenia inter spiritalia qualis invenitur inter liquida; nam tum demum hæc simulacra per Analogiam non incommode substituentur.

Atque de Instantiis istis Supplementi, quod diximus informationem ab iis hauriendam esse, quando desint instantiæ propriæ, loco Perfugii; nihilominus intelligi volumus, quod illæ etiam magni sint usus etiam cum propriæ instantiæ adsint; ad roborandam scilicet informationem una cum propriis.

section is negative with respect to any longitudinal one, but also of the more complicated relations between two different portions of the same section.

Verum de his exactius dicemus quando ad *Adminicula Inductionis* tractanda sermo ordine dilabetur.

XLIII.

Inter Prærogativas Instantiarum, ponemus loco vicesimo *Instantias Persecantes;* quas etiam *Instantias Vellicantes* appellare consuevimus, sed diversa ratione. Vellicantes enim eas appellamus, quia vellicant intellectum; Persecantes, quia persecant naturam; unde etiam illas quandoque *Instantias Democriti* nominamus. Eæ sunt, quæ de admirabili et exquisita subtilitate naturæ intellectum submonent, ut excitetur et expergiscatur ad attentionem et observationem et inquisitionem debitam. Exempli gratia; quod parum guttulæ atramenti ad tot literas vel lineas extendatur; quod argentum, exterius tantum inauratum, ad tantam longitudinem fili inaurati continuetur[1]; quod pusillus vermiculus, qualis in cute invenitur, habeat in se spiritum simul et figuram dissimilarem partium; quod parum croci etiam dolium aquæ colore inficiat; quod parum zibethi[2] aut aromatis longe majus contentum aëris odore; quod exiguo suffitu tanta excitetur nubes fumi; quod sonorum tam accuratæ differentiæ, quales sint voces articulatæ, per aërem undequaque vehantur, atque per foramina et poros etiam ligni et aquæ (licet admodum extenuatæ) penetrent, quin etiam repercutiantur, idque tam distincte et velociter; quod lux et color, etiam tanto ambitu et tam perniciter, per corpora solida vitri, aquæ, et cum tanta et tam exquisita varietate imaginum permeent, etiam refringantur et reflectantur; quod magnes per corpora omnigena, etiam maxime compacta, operetur. Sed (quod magis mirum est) quod in his omnibus, in medio adiaphoro (quale est aër) unius actio aliam non magnopere impediat; nempe quod eodem tempore per spatia aëris devehantur et visibilium tot imagines, et vocis articulatæ tot percussiones, et tot odores specificati, ut violæ, rosæ; etiam calor et frigus et virtutes magneticæ; omnia (inquam) simul, uno alterum non impediente, ac si singula haberent vias et meatus suos proprios separatos, neque unum in alterum impingeret aut incurreret.

Solemus tamen utiliter hujusmodi Instantiis Persecantibus subjungere instantias, quas *Metas Persecationis* appellare con-

[1] Dr. Woolaston's method for obtaining wires of extreme fineness was perhaps suggested by the circumstance mentioned in the text. He enclosed a gold wire in a cylinder of silver, drew them out together, and then dissolved away the silver by means of warm nitrous acid.

[2] Civet.

suevimus; veluti quod in iis quæ diximus, una actio in diverso genere aliam non perturbet aut impediat, cum tamen in eodem genere una aliam domet et extinguat: veluti, lux solis, lucem cicindelæ; sonitus bombardæ, vocem; fortior odor, delicatiorem; intensior calor, remissiorem; lamina ferri interposita inter magnetem et aliud ferrum, operationem magnetis. Verum de his quoque inter Adminicula Inductionis erit proprius dicendi locus.

XLIV.

Atque de instantiis quæ juvant sensum, jam dictum est; quæ præcipui usus sunt ad partem Informativam. Informatio enim incipit a sensu. At universum negotium desinit in Opera; atque quemadmodum illud principium, ita hoc finis rei est. Sequentur itaque instantiæ præcipui usus ad partem Operativam. Eæ genere duæ sunt, numero septem; quas universas, generali nomine, *Instantias Practicas* appellare consuevimus. Operativæ autem partis, vitia duo; totidemque dignitates instantiarum in genere. Aut enim fallit operatio, aut onerat nimis. Fallit operatio maxime (præsertim post diligentem naturarum inquisitionem) propter male determinatas et mensuratas corporum vires et actiones. Vires autem et actiones corporum circumscribuntur et mensurantur, aut per spatia loci, aut per momenta temporis, aut per unionem quanti, aut per prædominantiam virtutis; quæ quatuor nisi fuerint probe et diligenter pensitata, erunt fortasse scientiæ speculatione quidem pulchræ, sed opere inactivæ. Instantias vero quatuor itidem quæ huc referuntur, uno nomine *Instantias Mathematicas* vocamus, et *Instantias Mensuræ.*

Onerosa autem fit praxis, vel propter misturam rerum inutilium, vel propter multiplicationem instrumentorum, vel propter molem materiæ et corporum quæ ad aliquod opus requiri contigerint. Itaque eæ instantiæ in pretio esse debent, quæ aut dirigunt operativam ad ea quæ maxime hominum intersunt; aut quæ parcunt instrumentis; aut quæ parcunt materiæ sive supellectili. Eas autem tres instantias quæ huc pertinent, uno nomine *Instantias Propitias* sive *Benevolas* vocamus. Itaque de his septem instantiis jam sigillatim dicemus; atque cum iis partem illam de Prærogativis sive Dignitatibus Instantiarum claudemus.

XLV.

Inter Prærogativas Instantiarum, ponemus loco vicesimo

primo *Instantias Virgæ*, sive *Radii*; quas etiam *Instantias Perlationis*, vel *de Non Ultra* appellare consuevimus. Virtutes enim rerum et motus operantur et expediuntur per spatia non indefinita aut fortuita, sed finita et certa; quæ ut in singulis naturis inquisitis teneantur et notentur plurimum interest Practicæ, non solum ad hoc, ut non fallat, sed etiam ut magis sit aucta et potens. Etenim interdum datur virtutes producere, et distantias tanquam retrahere in propius; ut in perspecillis.

Atque plurimæ virtutes operantur et afficiunt tantum per tactum manifestum; ut fit in percussione corporum, ubi alterum non summovet alterum, nisi impellens impulsum tangat. Etiam medicinæ quæ exterius applicantur, ut unguenta, emplastra, non exercent vires suas nisi per tactum corporis. Denique objecta sensuum tactus et gustus non feriunt nisi contigua organis.

Sunt et aliæ virtutes quæ operantur ad distantiam, verum valde exiguam, quarum paucæ adhuc notatæ sunt, cum tamen plures sint quam homines suspicentur; ut (capiendo exempla ex vulgatis) cum succinum [1] aut gagates [2] trahunt paleas; bullæ approximatæ solvunt bullas; medicinæ nonnullæ purgativæ eliciunt humores ex alto [3], et hujusmodi. At virtus illa magnetica per quam ferrum et magnes, vel magnetes invicem, coëunt, operatur intra orbem virtutis certum, sed parvum; ubi contra, si sit aliqua virtus magnetica emanans ab ipsa terra (paulo nimirum interiore) super acum ferream, quatenus ad verticitatem, operatio fiat ad distantiam magnam.

Rursus, si sit aliqua vis magnetica quæ operetur per consensum inter globum terræ et ponderosa, aut inter globum lunæ et aquas maris (quæ maxime credibilis videtur in fluxibus et refluxibus semi-menstruis [4]), aut inter cœlum stellatum et

[1] Amber. [2] Jet.

[3] Bacon here speaks in accordance with the medical theory in which the brain is the origin and seat of the rheum, which descends from thence and produces disease in other organs — a theory preserved in the word catarrh. Certain purgatives were supposed to draw the rheum down.

[4] It is worth remarking that Galileo speaks contemptuously of the notion that the moon exerts any influence on the tides. His strong wish to explain everything mechanically led him in this instance wrong, as a similar wish has led many others. It arose, not unnaturally, from a reaction against the unsatisfactory explanations which the schoolmen were in the habit of deducing from the specific or occult properties of bodies. Even Leibnitz, in his controversy with Clarke, shows a tendency towards an exclusive preference of a mechanical system of physics, though in other parts of his writings he had spoken favourably of the doctrine of attraction, and though his whole philosophy ought, one would think, to have made him indifferent to the point in dispute. In a system of pre-established harmony, action by contact is as merely apparent as action at a distance.

planetas, per quam evocentur et attollantur ad sua apogæa; hæc omnia operantur ad distantias admodum longinquas. Inveniuntur et quædam inflammationes sive conceptiones flammæ, quæ fiunt ad distantias bene magnas, in aliquibus materiis; ut referunt de naphtha Babylonica.[1] Calores etiam insinuant se per distantias amplas, quod etiam faciunt frigora; adeo ut habitantibus circa Canadam moles sive massæ glaciales, quæ abrumpuntur et natant per oceanum septentrionalem et deferuntur per Atlanticum versus illas oras, percipiantur et incutiant frigora e longinquo. Odores quoque (licet in his videatur semper esse quædam emissio corporea) operantur ad distantias notabiles; ut evenire solet navigantibus juxta litora Floridæ, aut etiam nonnulla Hispaniæ, ubi sunt sylvæ totæ ex arboribus limonum, arantiorum[2], et hujusmodi plantarum odoratarum, aut frutices rorismarini, majoranæ, et similium.[3] Postremo radiationes lucis et impressiones sonorum operantur scilicet ad distantias spatiosas.

Verum hæc omnia, utcunque operentur ad distantias parvas sive magnas, operantur certe ad finitas et naturæ notas[4], ut sit quiddam *Non Ultra;* idque pro rationibus, aut molis seu quanti corporum; aut vigoris et debilitatis virtutum; aut favoribus et impedimentis mediorum; quæ omnia in computationem venire et notari debent. Quinetiam mensuræ motuum violentorum (quos vocant), ut missilium, tormentorum, rotarum, et similium, cum hæ quoque manifesto suos habeant limites certos, notandæ sunt.

Inveniuntur etiam quidam motus et virtutes contrariæ illis quæ operantur per tactum et non ad distans; quæ operantur scilicet ad distans et non ad tactum; et rursus, quæ operantur remissius ad distantiam minorem et fortius ad distantiam majorem. Etenim visio non bene transigitur ad tactum, sed indiget medio et distantia. Licet meminerim me audisse ex relatione cujusdam fide digni, quod ipse in curandis oculorum suorum cataractis (erat autem cura talis, ut immitteretur festuca quædam parva argentea intra primam oculi tunicam, quæ pelliculam illam cataractæ removeret et truderet in angulum oculi) clarissime vidisset festucam illam supra ipsam pupillam moventem.

[1] Strabo, xvi. p. 742. Pliny, ii. § 109.
[2] [So in the original edition.] Qy. aurantiorum?
[3] To the same purpose Milton, *Paradise Lost*, iv. 99.: —

As when to them who sail
Beyond the Cape of Hope, &c.

[4] i. e. fixed in the nature of things.

Quod utcunque verum esse possit, manifestum est majora corpora non bene aut distincte cerni nisi in cuspide coni[1], coëuntibus radiis objecti ad nonnullam distantiam. Quin etiam in senibus oculus melius cernit remoto objecto paulo longius, quam propius. In missilibus autem certum est percussionem non fieri tam fortem ad distantiam nimis parvam, quam paulo post. Hæc itaque et similia in mensuris motuum quoad distantias notanda sunt.

Est et aliud genus mensuræ localis motuum, quod non prætermittendum est. Illud vero pertinet ad motus non progressivos, sed sphæricos; hoc est, ad expansionem corporum in majorem sphæram, aut contractionem in minorem. Inquirendum enim est inter mensuras istas motuum, quantam compressionem aut extensionem corpora (pro natura ipsorum) facile et libenter patiantur, et ad quem terminum reluctari incipiant, adeo ut ad extremum *Non Ultra* ferant; ut cum vesica inflata comprimitur, sustinet illa compressionem nonnullam aëris, sed si major fuerit, non patitur aër, sed rumpitur vesica.

At nos hoc ipsum subtiliore experimento magis exacte probavimus. Accepimus enim campanulam ex metallo, leviorem scilicet et tenuiorem, quali ad excipiendum salem utimur; eamque in pelvim aquæ immisimus, ita ut deportaret secum aërem qui continebatur in concavo usque ad fundum pelvis. Locaveramus autem prius globulum in fundo pelvis, super quem campanula imponenda esset. Quare illud eveniebat, ut si globulus ille esset minusculus (pro ratione concavi), reciperet se aër in locum minorem, et contruderetur solum, non extruderetur. Quod si grandioris esset magnitudinis quam ut aër libenter cederet, tum aër majoris pressuræ impatiens campanulam ex aliqua parte elevabat, et in bullis ascendebat.

Etiam ad probandum qualem extensionem (non minus quam compressionem) pateretur aër, tale quippiam practicavimus. Ovum vitreum accepimus, cum parvo foramine in uno extremo ovi. Aërem per foramen exuctione forti attraximus, et statim digito foramen illud obturavimus, et ovum in aquam immersimus, et dein digitum removimus. Aër vero tensura illa per exuctionem facta tortus et magis quam pro natura sua dilatatus, ideoque se recipere et contrahere nitens (ita ut si ovum illud in aquam non fuisset immersum, aërem ipsum traxisset

[1] That is, the eye being at the apex of the visual cone.

cum sibilo), aquam traxit ad tale quantum quale sufficere posset ad hoc, ut aër antiquam recuperaret sphæram sive dimensionem.[1]

Atque certum est corpora tenuiora (quale est aër) pati contractionem nonnullam notabilem, ut dictum est; at corpora tangibilia (quale est aqua) multo ægrius et ad minus spatium patiuntur compressionem. Qualem autem patiatur, tali experimento inquisivimus.

Fieri fecimus globum ex plumbo cavum, qui duas circiter pintas vinarias contineret; eumque satis per latera crassum, ut majorem vim sustineret. In illum aquam immisimus, per foramen alicubi factum; atque foramen illud, postquam globus aqua impletus fuisset, plumbo liquefacto obturavimus, ut globus deveniret plane consolidatus. Dein globum forti malleo ad duo latera adversa complanavimus; ex quo necesse fuit aquam in minus contrahi, cum sphæra figurarum sit capacissima. Deinde, cum malleatio non amplius sufficeret, ægrius se recipiente aqua, molendino[2] seu torculari usi sumus; ut tandem aqua, impatiens pressuræ ulterioris, per solida plumbi (instar roris delicati) exstillaret. Postea, quantum spatii per eam compressionem imminutum foret computavimus; atque tantam compressionem passam esse aquam (sed violentia magna subactam) intelleximus.[3]

[1] This explanation is wholly unsatisfactory. The principle upon which the true explanation depends, namely the pressure of the atmosphere, was, it seems tolerably certain, first suggested by Torricelli. If the experiment were performed in vacuo, no water would enter the egg, unless the egg were plunged to a considerable depth into the water, or unless the vacuum within it were more perfect than could be produced in the manner described.

[2] Molendinum is properly a Low Latin word for a mill-house; here used for a press.

[3] This is perhaps the most remarkable of Bacon's experiments; and it is singular that it was so little spoken of by subsequent writers. Nearly fifty years after the publication of the *Novum Organum*, an account of a similar experiment was published by Megalotti, who was secretary of the Accademia del Cimento at Florence; and it has since been familiarly known as the Florentine experiment. I quote his account of it. "Facemmo lavorar di getto una grande ma sottil palla d'argento, e quella ripiena d'acqua raffreddata col ghiaccio serramo con saldissime vite. Di poi cominciammo a martellarla leggiermente per ogni verso, onde ammaccato l'argento (il quale per la sua crudezza non comporta d'assottigliarsi e distendersi come farebbe l'oro raffinato, o il piombo, o altro metallo più dolce) veniva a ristrignersi, e scemare la sua interna capacità, senza che l'acqua patisse una minima compressione, poichè ad ogni colpo si videa trasudare per tutti i pori del metallo a guisa d'argento vivo il quale da alcuna pelle premuto minutamente sprizzasse." — *Saggi di naturali Esperienze fatte nell'Accademia del Cimento*, p. 204. Firenze, 1667. The writer goes on to remark that the absolute incompressibility of water is not proved by this experiment, but merely that it is not to be compressed in the manner described. But the experiment is on other grounds inconclusive.

It is to be remarked that Leibnitz, *Nouveaux Essais*, in mentioning the Florentine

At solidiora, sicca, aut magis compacta, qualia sunt lapides et ligna, nec non metalla, multo adhuc minorem compressionem aut extensionem, et fere imperceptibilem ferunt; sed vel fractione, vel progressione, vel aliis pertentationibus se liberant; ut in curvationibus ligni aut metalli, horologiis moventibus per complicationem laminæ, missilibus, malleationibus, et innumeris aliis motibus apparet. Atque hæc omnia cum mensuris suis in indagatione naturæ notanda et exploranda sunt, aut in certitudine sua, aut per æstimativas, aut per comparativas, prout dabitur copia.

XLVI.

Inter Prærogativas Instantiarum, ponemus loco vicesimo secundo *Instantias Curriculi*, quas etiam *Instantias ad Aquam* appellare consuevimus; sumpto vocabulo a clepsydris apud antiquos, in quas infundebatur aqua, loco arenæ. Eæ mensurant naturam per momenta temporis, quemadmodum *Instantiæ Virgæ* per gradus spatii. Omnis enim motus sive actio naturalis transigitur in tempore; alius velocius, alius tardius, sed utcunque momentis certis et naturæ notis. Etiam illæ actiones quæ subito videntur operari, et in ictu oculi (ut loquimur), deprehenduntur recipere majus et minus quoad tempus.

Primo itaque videmus restitutiones corporum cœlestium fieri per tempora numerata; etiam fluxus et refluxus maris. Latio autem gravium versus terram et levium versus ambitum cœli, fit per certa momenta, pro ratione corporis quod fertur, et medii.[1] At velificationes navium, motus animalium, perlationes missilium, omnes fiunt itidem per tempora (quantum ad summas) numerabilia. Calorem vero quod attinet, videmus pueros per hyemem manus in flamma lavare, nec tamen uri; et joculatores vasa plena vino vel aqua, per motus agiles et æquales, vertere deorsum et sursum recuperare, non effuso liquore; et multa hujusmodi. Nec minus ipsæ compressiones et dilatationes et eruptiones corporum fiunt, aliæ velocius, aliæ tardius, pro natura corporis et motus, sed per momenta certa. Quinetiam in explosione plurium bombardarum simul, quæ exaudiuntur quandoque ad distantiam triginta milliarium, per-

experiment, says that the globe was of gold (p. 229. Erdmann), whereas the Florentine academicians expressly say why they preferred silver to either gold or lead.

[1] Galileo had shown, before the year 1592, that the resistance of the air being set aside, all bodies fall with equal velocity. He left Pisa in that year in consequence of the disputes which were occasioned by this refutation of the Aristotelian doctrine, that the velocity is as the weight.

cipitur sonus prius ab iis qui prope absunt a loco ubi fit sonitus, quam ab iis qui longe. At in visu (cujus actio est pernicissima) liquet etiam requiri ad eum actuandum momenta certa temporis; idque probatur ex iis quæ propter motus velocitatem non cernuntur; ut ex latione pilæ ex sclopeto. Velocior enim est prætervolatio pilæ quam impressio speciei ejus quæ deferri poterat ad visum.[1]

Atque hoc, cum similibus, nobis quandoque dubitationem peperit plane monstrosam; videlicet, utrum cœli sereni et stellati facies ad idem tempus cernatur quando vere existit, an potius aliquanto post; et utrum non sit (quatenus ad visum cœlestium) non minus tempus verum et tempus visum, quam locus verus et locus visus, qui notatur ab astronomis in parallaxibus.[2] Adeo incredibile nobis videbatur, species sive radios corporum cœlestium per tam immensa spatia milliarium subito deferri posse ad visum; sed potius debere eas in tempore aliquo notabili delabi. Verum illa dubitatio (quoad majus aliquod intervallum temporis inter tempus verum et visum) postea plane evanuit; reputantibus nobis jacturam illam infinitam et diminutionem quanti, quatenus ad apparentiam, inter corpus stellæ verum et speciem visam, quæ causatur a distantia; atque simul notantibus ad quantam distantiam (sexaginta scilicet ad minimum milliariorum) corpora, eaque tantum albicantia, subito hic apud nos cernantur; cum dubium non sit lucem cœlestium, non tantum albedinis vividum colorem, verum etiam omnis flammæ (quæ apud nos nota est) lucem, quoad vigorem radiationis, multis partibus excedere. Etiam immensa illa velocitas in ipso corpore, quæ cernitur in motu diurno (quæ etiam viros graves ita obstupefecit ut mallent credere motum terræ), facit motum illum ejaculationis radiorum ab ipsis (licet celeritate, ut diximus, mirabilem) magis credibilem. Maxime vero omnium nos movit, quod si interponeretur intervallum temporis aliquod notabile inter veritatem et visum, foret ut species per nubes interim orientes et similes medii perturbationes interciperentur sæpenumero, et confunderentur.[3] Atque de mensuris temporum simplicibus hæc dicta sint.

[1] *i. e.* the ball flies past in less time than the image conveyed to the sight requires to make an impression.

[2] *i. e.* which is taken account of in the correction for parallaxes.

[3] I do not know how to understand this passage without attributing to Bacon a confusion of ideas which seems hardly credible. For surely the very thing which he supposes *would* happen if there were a perceptible interval between the *veritas* and the *visus*, that is to say, between the time when a star (for instance) *is* at a given point and the

Verum non solum quærenda est mensura motuum et actionum simpliciter, sed multo magis comparative: id enim eximii est usus, et ad plurima spectat. Atque videmus flammam alicujus tormenti ignei citius cerni, quam sonitus audiatur; licet necesse sit pilam prius aërem percutere, quam flamma quæ pone erat exire potuerit; fieri hoc autem propter velociorem transactionem motus lucis, quam soni. Videmus etiam species visibiles a visu citius excipi quam dimitti; unde fit quod nervi fidium, digito impulsi, duplicentur aut triplicentur quoad speciem, quia species nova recipitur, antequam prior demittatur; ex quo etiam fit, ut annuli rotati videantur globosi, et fax ardens, noctu velociter portata, conspiciatur caudata.[1] Etiam ex hoc fundamento inæqualitatis motuum quoad velocitatem, excogitavit Galilæus causam fluxus et refluxus maris; rotante terra velocius, aquis tardius; ideoque accumulantibus se aquis in sursum, et deinde per vices se remittentibus in deorsum, ut demonstratur in vase aquæ incitatius movente.[2] Sed hoc commentus est concesso non concessibili (quod terra nempe moveatur), ac etiam non bene informatus de oceani motu sexhorario.

At exemplum hujus rei de qua agitur, videlicet de compa-

time when we see it there,—in other words, if the image took any time in coming to the eye,—this very thing does actually happen as often as the star is hidden by a cloud or dimmed by a vapour: the species, to use his own word, are intercepted or confused. If, indeed, the *force* of the rays were diminished, — and this I suppose would be one consequence of diminished velocity, — the thing would happen more frequently, because there would be more obstructions which they could not overcome: they would be intercepted or confused by media which they now pass through. But the force being the same, and the stream continuous, the *time* of passage could make no difference in this respect. In another respect, namely the facility of observation, it would make a very great difference; and it is remarked by Brinkley that, if the velocity of light had been much less than it is, astronomy would have been all but an impossible science. But that is another matter. — *J. S.*

[1] Of the phenomena which he here enumerates Bacon undoubtedly gives the right explanation, though in the case of vibrating strings his explanation is not altogether complete. The distinct or quasi-distinct images to which he refers correspond to limiting positions of the vibrating string.

[2] This account of Galileo's theory of the tides is inaccurate. In this theory the tides are caused by the varying velocity of different points of the earth's surface, arising from the composition of the earth's two motions, namely that about its axis, and that in its orbit. Bacon does not seem to have perceived that both these motions are essential to the explanation. That the earth's being in motion might be the cause of the tides, had been suggested before the time of Galileo by Cæsalpinus in the *Quæstiones Peripateticæ*, iii. 5. It is odd that Patritius, in giving an account of all the theories which had in his time been devised to explain the cause of the tides (see his *Pancosmias*, l. 28.), does not mention Cæsalpinus's, though it was published some years before his own work. Galileo perhaps alludes to Cæsalpinus in his letter to Cardinal Orsino, dated 8th January, 1616. See, for remarks on Cæsalpinus's doctrine, the *Problemata Marina* of Casmann, published in 1596. Casmann's own theory is that of expansion.

rativis mensuris motuum, neque solum rei ipsius, sed et usus insignis ejus (de quo paulo ante loquuti sumus), eminet in cuniculis subterraneis, in quibus collocatur pulvis pyrius; ubi immensæ moles terræ, ædificiorum, et similium, subvertuntur, et in altum jaciuntur, a pusilla quantitate pulveris pyrii. Cujus causa pro certo illa est, quod motus dilatationis pulveris, qui impellit, multis partibus sit pernicior, quam motus gravitatis per quem fieri possit aliqua resistentia; adeo ut primus motus perfunctus sit, antequam motus adversus inceperit; ut in principiis nullitas quædam sit resistentiæ. Hinc etiam fit, quod in omni missili, ictus, non tam robustus quam acutus et celer, ad perlationem potissimum valeat. Neque etiam fieri potuisset, ut parva quantitas spiritus animalis in animalibus, præsertim in tam vastis corporibus qualia sunt balænæ aut elephanti, tantam molem corpoream flecteret et regeret, nisi propter velocitatem motus spiritus, et hebetudinem corporeæ molis, quatenus ad expediendam suam resistentiam.

Denique, hoc unum ex præcipuis fundamentis est experimentorum magicorum, de quibus mox dicemus; ubi scilicet parva moles materiæ longe majorem superat et in ordinem redigit: hoc, inquam, si fieri possit anteversio motuum per velocitatem unius, antequam alter se expediat.

Postremo, hoc ipsum *Prius* et *Posterius* in omni actione naturali notari debet; veluti quod in infusione rhabarbari eliciatur purgativa vis prius, astrictiva post; simile quiddam etiam in infusione violarum in acetum experti sumus; ubi primo excipitur suavis et delicatus floris odor; post, pars floris magis terrea, quæ odorem confundit. Itaque si infundantur violæ per diem integrum, odor multo languidius excipitur; quod si infundantur per partem quartam horæ tantum, et extrahantur; et (quia paucus est spiritus odoratus qui subsistit in viola) infundantur post singulas quartas horæ violæ novæ et recentes ad sexies; tum demum nobilitatur infusio, ita ut licet non manserint violæ, utcunque renovatæ, plus quam ad sesquihoram, tamen permanserit odor gratissimus, et viola ipsa non inferior, ad annum integrum. Notandum tamen est, quod non se colligat odor ad vires suas plenas, nisi post mensem ab infusione. In distillationibus vero aromatum maceratorum in spiritu vini patet quod surgat primo phlegma aqueum et inutile, deinde aqua plus habens ex spiritu vini, deinde post aqua plus habens ex aromate. Atque hujus generis quamplurima inveniuntur

in distillationibus notatu digna. Verum hæc sufficiant ad exempla.

XLVII.

Inter Prærogativas Instantiarum, ponemus loco vicesimo tertio *Instantias Quanti*, quas etiam *Doses Naturæ* (sumpto vocabulo a Medicinis) vocare consuevimus. Eæ sunt quæ mensurant virtutes per *Quanta* corporum, et indicant quid *Quantum Corporis* faciat ad *Modum Virtutis*. Ac primo sunt quædam virtutes quæ non subsistunt nisi in Quanto Cosmico, hoc est, tali Quanto quod habeat consensum cum configuratione et fabrica universi. Terra enim stat; partes ejus cadunt. Aquæ in maribus fluunt et refluunt; in fluviis minime, nisi per ingressum maris. Deinde etiam omnes fere virtutes particulares secundum multum aut parvum corporis operantur. Aquæ largæ non facile corrumpuntur; exiguæ cito. Mustum et cervisia maturescunt longe citius, et fiunt potabilia, in utribus parvis, quam in doliis magnis. Si herba ponatur in majore portione liquoris, fit infusio, magis quam imbibitio[1]; si in minore, fit imbibitio, magis quam infusio. Aliud igitur erga corpus humanum est balneum, aliud levis irroratio. Etiam parvi rores in aëre nunquam cadunt, sed dissipantur et cum aëre incorporantur. Et videre est in anhelitu super gemmas, parum illud humoris, quasi nubeculam vento dissipatam, continuo solvi. Etiam frustum ejusdem magnetis non trahit tantum ferri, quantum magnes integer. Sunt etiam virtutes in quibus parvitas Quanti magis potest; ut in penetrationibus, stylus acutus citius penetrat, quam obtusus; adamas punctuatus sculpit in vitro; et similia.

Verum non hic morandum est in indefinitis, sed etiam de *rationibus* Quanti corporis erga modum virtutis inquirendum. Proclive enim foret credere, quod rationes Quanti rationes virtutis adæquarent; ut si pila plumbea unius unciæ caderet in tali tempore, pila unciarum duarum deberet cadere duplo celerius, quod falsissimum est. Nec eædem rationes in omni genere virtutum valent, sed longe diversæ. Itaque hæ mensuræ ex rebus ipsis petendæ sunt, et non ex verisimilitudine aut conjecturis.

Denique in omni inquisitione naturæ Quantum corporis requiratur ad aliquod effectum, tanquam dosis, notandum; et cautiones de *Nimis* et *Parum* aspergendæ.

[1] Absorption.

XLVIII.

Inter Prærogativas Instantiarum, ponemus loco vicesimo quarto *Instantias Luctæ;* quas etiam *Instantias Prædominantiæ* appellare consuevimus. Eæ indicant prædominantiam et cessionem virtutum ad invicem; et quæ ex illis sit fortior et vincat, quæ infirmior et succumbat. Sunt enim motus et nixus corporum compositi, decompositi, et complicati, non minus quam corpora ipsa. Proponemus igitur primum species præcipuas motuum sive virtutum activarum; ut magis perspicua sit ipsarum comparatio in robore, et exinde demonstratio atque designatio Instantiarum Luctæ et Prædominantiæ.

Motus Primus sit Motus *Antitypiæ*[1] materiæ, quæ inest in singulis portionibus ejus; per quem plane annihilari non vult: ita ut nullum incendium, nullum pondus aut depressio, nulla violentia, nulla denique ætas aut diuturnitas temporis possit redigere aliquam vel minimam portionem materiæ in nihilum; quin illa et sit aliquid, et loci aliquid occupet, et se (in qualicunque necessitate ponatur) vel formam mutando vel locum liberet, vel (si non detur copia) ut est subsistat; neque unquam res eo deveniat, ut aut nihil sit, aut nullibi. Quem Motum Schola (quæ semper fere et denominat et definit res potius per effectus et incommoda quam per causas interiores) vel denotat per illud axioma, quod *Duo corpora non possint esse in uno loco;* vel vocat motum *Ne fiat penetratio dimensionum.* Neque hujus motus exempla proponi consentaneum est: inest enim omni corpori.

Sit Motus Secundus, Motus (quem appellamus) *Nexus;* per quem corpora non patiuntur se ulla ex parte sui dirimi a contactu alterius corporis, ut quæ mutuo nexu et contactu gaudeant. Quem motum Schola vocat Motum *Ne detur vacuum:* veluti cum aqua attrahitur sursum exuctione, aut per fistulas; caro per ventosas; aut cum aqua sistitur nec effluit in hydriis perforatis, nisi os hydriæ ad immittendum aërem aperiatur; et innumera id genus.

Sit Motus Tertius, Motus (quem appellamus) *Libertatis;* per quem corpora se liberare nituntur a pressura aut tensura præter-naturali, et restituere se in dimensum corpori suo conveniens. Cujus motus etiam innumera sunt exempla: veluti (quatenus ad liberationem a pressura) aquæ in natando, aëris in volando; aquæ in remigando, aëris in undulationibus ventorum;

[1] This term was first used by Aristotle.

laminæ in horologiis. Nec inelegantes se ostendit motus aëris compressi in sclopettis ludicris puerorum, cum alnum aut simile quiddam excavant, et infarciunt frusto alicujus radicis succulentæ, vel similium, ad utrosque fines; deinde per embolum[1] trudunt radicem vel hujusmodi farcimentum in foramen alterum; unde emittitur et ejicitur radix cum sonitu ad foramen alterum, idque antequam tangatur a radice aut farcimento citimo, aut embolo. Quatenus vero ad liberationem a tensura, ostendit se hic motus in aëre post exuctionem in ovis vitreis remanente; in chordis, in corio, et panno; resilientibus post tensuras suas, nisi tensuræ illæ per moram invaluerint, etc. Atque hunc motum Schola sub nomine Motus ex *Forma Elementi* innuit: satis quidem inscite, cum hic motus non tantum ad aërem, aquam, aut flammam pertineat, sed ad omnem diversitatem consistentiæ; ut ligni, ferri, plumbi, panni, membranæ, etc., in quibus singula corpora suæ habent dimensionis modulum, et ab eo ægre ad spatium aliquod notabile abripiuntur. Verum quia Motus iste Libertatis omnium est maxime obvius, et ad infinita spectans, consultum fuerit eum bene et perspicue distinguere. Quidam enim valde negligenter confundunt hunc motum cum gemino illo motu *Antitypiæ* et *Nexus;* liberationem scilicet a pressura, cum motu Antitypiæ; a tensura, cum motu Nexus; ac si ideo cederent aut se dilatarent corpora compressa, ne sequeretur *penetratio dimensionum;* ideo resilirent et contraherent se corpora tensa, ne sequeretur *vacuum.* Atqui si aër compressus se vellet recipere in densitatem aquæ, aut lignum in densitatem lapidis, nil opus foret penetratione dimensionum; et nihilominus longe major posset esse compressio illorum, quam illa ullo modo patiuntur. Eodem modo si aqua se dilatare vellet in raritatem aëris, aut lapis in raritatem ligni, non opus foret vacuo; et tamen longe major posset fieri extensio eorum, quam illa ullo modo patiuntur. Itaque non reducitur res ad penetrationem dimensionum et vacuum, nisi in ultimitatibus condensationis et rarefactionis; cum tamen isti motus longe citra eas sistant et versentur, neque aliud sint quam desideria corporum conservandi se in consistentiis suis (sive, si malint, in formis suis), nec ab iis recedendi subito, nisi per modos suaves ac per consensum alterentur. At longe magis necessarium est (quia multa secum trahit), ut intimetur hominibus, motum violentum (quem nos *Mechanicum*, Demo-

[1] Ἔμβολος, anything introduced [a ramrod ?].

critus, qui in motibus suis primis expediendis etiam infra mediocres philosophos ponendus est, motum *Plagæ* vocavit) nil aliud esse quam Motum Libertatis, scilicet a compressione ad relaxationem. Etenim in omni sive simplici protrusione sive volatu per aërem, non fit summotio aut latio localis, antequam partes corporis præter-naturaliter patiantur et comprimantur ab impellente. Tum vero partibus aliis alias per successionem trudentibus, fertur totum; nec solum progrediendo, sed etiam rotando simul; ut etiam hoc modo partes se liberare, aut magis ex æquo tolerare possint. Atque de hoc Motu hactenus.

Sit Motus Quartus, motus cui nomen dedimus Motus *Hyles:* qui motus antistrophus est quodammodo Motui, de quo diximus, Libertatis. Etenim in Motu Libertatis, corpora novum dimensum sive novam sphæram sive novam dilatationem aut contractionem (hæc enim verborum varietas idem innuit) exhorrent, respuunt, fugiunt, et resilire ac veterem consistentiam recuperare totis viribus contendunt. At contra in hoc Motu Hyles, corpora novam sphæram sive dimensum appetunt; atque ad illud libenter et propere, et quandoque valentissimo nixu (ut in pulvere pyrio) aspirant. Instrumenta autem hujus motus, non sola certe, sed potentissima, aut saltem frequentissima, sunt calor et frigus. Exempli gratia: aër, si per tensuram (velut per exuctionem in ovis vitreis) dilatetur, magno laboret desiderio seipsum restituendi. At admoto calore, e contra appetit dilatari, et concupiscit[1] novam sphæram, et transit et migrat in illam libenter tanquam in novam formam (ut loquuntur); nec post dilatationem nonnullam de reditu curat, nisi per admotionem frigidi ad eam invitetur; quæ non reditus est, sed transmutatio repetita. Eodem modo et aqua, si per compressionem arctetur, recalcitrat; et vult fieri qualis fuit, scilicet latior. At si interveniat frigus intensum et continuatum, mutat se sponte sua et libenter in condensationem glaciei; atque si plane continuetur frigus, nec a teporibus interrumpatur (ut fit in speluncis et cavernis paulo profundioribus), vertitur in crystallum[2] aut materiam similem, nec unquam restituitur.

Sit Motus Quintus, Motus *Continuationis.* Intelligimus au-

[1] *Concupiscet*, in the original. — *J. S.*

[2] Pliny, xxxvii. 9. Also Seneca, *Natural Questions.* Though this account of the origin of crystals is of course erroneous, yet there is a class of crystals which have been shown to occupy the volume which their water of crystallisation would in the state of ice; so that their other constituents may in some sort be said to take up no space. This curious analogy with ice was proved by Playfair and Joule in a very considerable number of cases. See *Phil. Mag.* Dec. 1845.

tem non continuationis simplicis et primariæ, cum corpore aliquo altero (nam ille est Motus Nexus); sed continuationis sui, in corpore certo. Certissimum enim est, quod corpora omnia solutionem continuitatis exhorreant; alia magis, alia minus, sed omnia aliquatenus. Nam ut in corporibus duris (veluti chalybis, vitri) reluctatio contra discontinuationem est maxime robusta et valida, ita etiam in liquoribus, ubi cessare aut languere saltem videtur motus ejusmodi, tamen non prorsus reperitur privatio ejus; sed plane inest ipsis in gradu tanquam infimo, et prodit se in experimentis plurimis; sicut in bullis, in rotunditate guttarum, in filis tenuioribus stillicidiorum, et in sequacitate corporum glutinosorum, et ejusmodi. Sed maxime omnium se ostendit appetitus iste, si discontinuatio tentetur usque ad fractiones minores. Nam in mortariis, post contusionem ad certum gradum, non amplius operatur pistillum; aqua non subintrat rimas minores; quin et ipse aër, non obstante subtilitate corporis ipsius, poros vasorum paulo solidiorum non pertransit subito, nec nisi per diuturnam insinuationem.

Sit Motus Sextus, motus quem nominamus Motum *ad Lucrum*, sive Motum *Indigentiæ*. Is est, per quem corpora, quando versantur inter plane heterogenea et quasi inimica, si forte nanciscantur copiam aut commoditatem evitandi illa heterogenea et se applicandi ad magis cognata, (licet illa ipsa cognata talia fuerint quæ non habeant arctum consensum cum ipsis) tamen statim ea amplectuntur, et tanquam potiora malunt; et lucri loco (unde vocabulum sumpsimus) hoc ponere videntur, tanquam talium corporum indiga. Exempli gratia: aurum, aut aliud metallum foliatum non delectatur aëre circumfuso. Itaque si corpus aliquod tangibile et crassum nanciscatur (ut digitum, papyrum, quidvis aliud), adhæret statim, nec facile divellitur. Etiam papyrus, aut pannus, et hujusmodi, non bene se habent cum aëre qui inseritur et commistus est in ipsorum poris. Itaque aquam aut liquorem libenter imbibunt, et aërem exterminant. Etiam saccharum, aut spongia infusa in aquam aut vinum, licet pars ipsorum emineat et longe attollatur supra vinum aut aquam, tamen aquam aut vinum paulatim et per gradus attrahunt in sursum.

Unde optimus canon sumitur aperturæ et solutionum corporum. Missis enim corrosivis et aquis fortibus, quæ viam sibi aperiunt, si possit inveniri corpus proportionatum et magis consentiens et amicum corpori alicui solido quam illud cum quo

tanquam per necessitatem commiscetur, statim se aperit et relaxat corpus, et illud alterum intro recipit, priore excluso aut summoto. Neque operatur aut potest iste Motus ad Lucrum solummodo ad tactum. Nam electrica operatio (de qua Gilbertus et alii post eum tantas excitarunt fabulas) non alia est quam corporis per fricationem levem excitati appetitus; qui aërem non bene tolerat, sed aliud tangibile mavult, si reperiatur in propinquo.

Sit Motus Septimus, Motus (quem appellamus) *Congregationis Majoris;* per quem corpora feruntur ad massas connaturalium suorum: gravia, ad globum terræ; levia, ad ambitum cœli. Hunc Schola nomine *Motus Naturalis* insignivit: levi contemplatione, quia scilicet nil spectabile erat ab extra quod eum motum cieret; (itaque rebus ipsis innatum atque insitum putavit); aut forte quia non cessat. Nec mirum: semper enim præsto sunt cœlum et terra; cum e contra causæ et origines plurimorum ex reliquis motibus interdum absint, interdum adsint. Itaque hunc, quia non intermittit sed cæteris intermittentibus statim occurrit, perpetuum et proprium; reliquos ascititios posuit. Est autem iste motus revera satis infirmus et hebes, tanquam is qui (nisi sit moles corporis major) cæteris motibus, quamdiu operantur, cedat et succumbat. Atque cum hic motus hominum cogitationes ita impleverit ut fere reliquos motus occultaverit, tamen parum est quod homines de eo sciunt, sed in multis circa illum erroribus versantur.

Sit Motus Octavus, Motus *Congregationis Minoris;* per quem partes homogeneæ in corpore aliquo separant se ab heterogeneis, et coëunt inter sese; per quem etiam corpora integra ex similitudine substantiæ se amplectuntur et fovent, et quandoque ad distantiam aliquam congregantur, attrahuntur, et conveniunt: veluti cum in lacte flos lactis post moram aliquam supernatat; in vino fæces et tartarum subsidunt. Neque enim hæc fiunt per motum gravitatis et levitatis tantum, ut aliæ partes summitatem petant, aliæ ad imum vergant; sed multo magis per desiderium homogeneorum inter se coeundi et se uniendi. Differt autem iste motus a Motu Indigentiæ, in duobus. Uno, quod in Motu Indigentiæ sit stimulus major naturæ malignæ et contrariæ; at in hoc motu (si modo impedimenta et vincula absint) uniuntur partes per amicitiam, licet absit natura aliena quæ litem moveat: altero, quod arctior sit unio, et tanquam majore cum delectu. In illo enim, modo

evitetur corpus inimicum, corpora etiam non admodum cognata concurrunt; at in hoc coëunt substantiæ, germana plane similitudine devinctæ, et conflantur tanquam in unum. Atque hic motus omnibus corporibus compositis inest; et se facile conspiciendum in singulis daret, nisi ligaretur et frænaretur per alios corporum appetitus et necessitates, quæ istam coitionem disturbant.

Ligatur autem motus iste plerumque tribus modis: torpore corporum; fræno corporis dominantis; et motu externo. Ad torporem corporum quod attinet; certum est inesse corporibus tangibilibus pigritiam quandam secundum magis et minus, et exhorrentiam motus localis; ut, nisi excitentur, malint statu suo (prout sunt) esse contenta quam in melius se expedire. Discutitur autem iste torpor triplici auxilio: aut per calorem, aut per virtutem alicujus cognati corporis eminentem, aut per motum vividum et potentem. Atque primo quoad auxilium caloris; hinc fit, quod calor pronuntietur esse illud quod *separet Heterogenea, congreget Homogenea.* Quam definitionem Peripateticorum merito derisit Gilbertus; dicens eam esse perinde ac si quis diceret ac definiret hominem illud esse quod serat triticum et plantet vineas: esse enim definitionem tantum per effectus, eosque particulares.[1] Sed adhuc magis culpanda est illa definitio; quia etiam effectus illi (quales quales sunt) non sunt ex proprietate caloris, sed tantum per accidens[2] (idem enim facit frigus, ut postea dicemus), nempe ex desiderio partium homogenearum coëundi; adjuvante tantum calore ad discutiendum torporem, qui torpor desiderium illud antea ligaverat. Quoad vero auxilium virtutis inditæ a corpore cognato; illud mirabiliter elucescit in magnete armato, qui excitat in ferro virtutem detinendi ferrum per similitudinem

[1] For the definition we may refer to the *Margarita Philosophiæ*, xi. 3 It is founded on a passage in the *De Gen. et Corr.* ii. 2. Gilbert's censure on it is to be found in his posthumous work *De Mundo nostro sublunari Philosophia nova*, which was published by Gruter in 1651, long after the death of Bacon. It seems however, as Gruter remarks, that the work, which he suggests may have been written before the treatise *De Magnete*, published in 1600, had been read in manuscript by "viri magni et famæ celeberrimæ." "Illi perspicace in Physicis præsertim ingenio haud pœnitendæ in evolvendo operæ testimonium dederunt, quod integrum excussisse censeantur, et aliqua a vulgaribus opinionibus abhorrentia calculo suo comprobata hinc sparsim citent;" in which I do not doubt that Gruter refers to Bacon. Bacon's quotation seems to have been made from imperfect memory, as the words of the original are:—"quid illud ostendit aut quæ illa differentia ab effectu tantum in quibusdam corporibus, *congregans homogenea et disgregans heterogenea?* ac si diceres hominem animal esse carduos et sentes evellens, et fruges serens, cum istud sit agricolæ studium."— *De Mundo*, &c., i. c. 26.

[2] *i. e.* they arise indirectly.

substantiæ, discusso torpore ferri per virtutem magnetis. Quoad vero auxilium motus; conspicitur illud in sagittis ligneis, cuspide etiam lignea; quæ altius penetrant in alia ligna quam si fuissent armatæ ferro, per similitudinem substantiæ, discusso torpore ligni per motum celerem: de quibus duobus experimentis etiam in aphorismo de Instantiis Clandestinis diximus.

Ligatio vero Motus Congregationis Minoris, quæ fit per frænum corporis dominantis, conspicitur in solutione sanguinis et urinarum per frigus. Quamdiu enim repleta fuerint corpora illa spiritu agili, qui singulas eorum partes cujuscunque generis ipse ut dominus totius ordinat et cohibet, tamdiu non coëunt homogenea[1] propter frænum; sed postquam ille spiritus evaporaverit, aut suffocatus fuerit per frigus, tum solutæ partes a fræno coëunt secundum desiderium suum naturale. Atque ideo fit, ut omnia corpora quæ continent spiritum acrem (ut sales, et hujusmodi) durent et non solvantur, ob frænum permanens et durabile spiritus dominantis et imperiosi.

Ligatio vero Motus Congregationis Minoris, quæ fit per motum externum, maxime conspicitur in agitationibus corporum per quas arcetur putrefactio. Omnis enim putrefactio fundatur in congregatione homogeneorum; unde paulatim fit corruptio prioris (quam vocant) formæ, et generatio novæ. Nam putrefactionem, quæ sternit viam ad generationem novæ formæ, præcedit solutio veteris; quæ est ipsa coitio ad homogeniam. Ea vero si non impedita fuerit, fit solutio simplex; sin occurrant varia quæ obstant, sequuntur putrefactiones quæ sunt rudimenta generationis novæ. Quod si (id quod nunc agitur) fiat agitatio frequens per motum externum, tum vero motus iste coitionis (qui est delicatus et mollis et indiget quiete ab externis) disturbatur et cessat; ut fieri videmus in innumeris; veluti cum quotidiana agitatio aut profluentia aquæ arceat putrefactionem; venti arceant pestilentiam aëris; grana in granariis versa et agitata maneant pura; omnia denique agitata exterius non facile putrefiant interius.

Superest ut non omittatur coitio illa partium corporum, unde fit præcipue induratio et desiccatio. Postquam enim spiritus, aut humidum in spiritum versum, evolaverit in aliquo corpore porosiore (ut in ligno, osse, membrana, et hujusmodi), tum partes crassiores majore nixu contrahuntur et coëunt, unde

[1] ["Heterogenea" in the original edition]; clearly a wrong reading: the sense requires "homogenea."

sequitur induratio aut desiccatio: quod existimamus fieri, non tam ob Motum Nexus, ne detur vacuum, quam per motum istum amicitiæ et unionis.

Ad coitionem vero ad distans quod attinet, ea infrequens est et rara; et tamen in pluribus inest quam quibus observatur. Hujus simulacra sunt, cum bulla solvat bullam; medicamenta ex similitudine substantiæ trahant humores; chorda in diversis fidibus ad unisonum moveat chordam; et hujusmodi. Etiam in spiritibus animalium hunc motum vigere existimamus, sed plane incognitum. At eminet certe in magnete, et ferro excito. Cum autem de motibus magnetis loquimur, distinguendi plane sunt. Quatuor enim virtutes sive operationes sunt in magnete, quæ non confundi, sed separari debent; licet admiratio hominum et stupor eas commiscuerit. Una, coitionis magnetis ad magnetem, vel ferri ad magnetem, vel ferri exciti ad ferrum. Secunda, verticitatis ejus ad septentriones et austrum, atque simul declinationis ejus. Tertia, penetrationis ejus per aurum, vitrum, lapidem, omnia. Quarta, communicationis virtutis ejus de lapide in ferrum, et de ferro in ferrum, absque communicatione substantiæ. Verum hoc loco de prima virtute ejus tantum loquimur, videlicet coitionis. Insignis etiam est motus coitionis argenti vivi et auri; adeo ut aurum alliciat argentum vivum, licet confectum in unguenta; atque operarii inter vapores argenti vivi soleant tenere in ore frustum auri, ad colligendas emissiones argenti vivi, alias crania et ossa eorum invasuras; unde etiam frustum illud paulo post albescit. Atque de Motu Congregationis Minoris hæc dicta sint.

Sit Motus Nonus, Motus *Magneticus;* qui licet sit ex genere Motus Congregationis Minoris, tamen si operetur ad distantias magnas et super massas rerum magnas, inquisitionem meretur separatam; præsertim si nec incipiat a tactu, quemadmodum plurimi, nec perducat actionem ad tactum, quemadmodum omnes motus congregativi; sed corpora tantum elevet, aut ea intumescere faciat, nec quicquam ultra. Nam si luna attollat aquas, aut turgescere aut intumescere faciat humida; aut cœlum stellatum attrahat planetas versus sua apogæa; aut sol alliget astra Veneris et Mercurii, ne longius absint a corpore ejus quam ad distantiam certam; videntur hi motus nec sub Congregatione Majore nec sub Congregatione Minore bene collocari; sed esse tanquam congregativa media et imperfecta, ideoque speciem debere constituere propriam.

Sic Motus Decimus, Motus *Fugæ;* motus scilicet Motui Congregationis Minoris contrarius; per quem corpora ex antipathia fugiunt et fugant inimica, seque ab illis separant, aut cum illis miscere se recusant. Quamvis enim videri possit in aliquibus hic motus esse motus tantum per accidens aut per consequens, respectu Motus Congregationis Minoris, quia nequeunt coire homogenea nisi heterogeneis exclusis et remotis; tamen ponendus est motus iste per se, et in speciem constituendus, quia in multis appetitus Fugæ cernitur magis principalis quam appetitus Coitionis.

Eminet autem hic motus insigniter in excretionibus animalium; nec minus etiam in sensuum nonnullorum odiosis objectis, præcipue in olfactu et gustu. Odor enim fœtidus ita rejicitur ab olfactu, ut etiam inducat in os stomachi motum expulsionis per consensum; sapor amarus et horridus ita rejicitur a palato aut gutture, ut inducat per consensum capitis conquassationem et horrorem. Veruntamen etiam in aliis locum habet iste motus. Conspicitur enim in antiperistasibus nonnullis; ut in aëris media regione, cujus frigora videntur esse rejectiones naturæ frigidæ ex confiniis cœlestium; quemadmodum etiam videntur magni illi fervores et inflammationes, quæ inveniuntur in locis subterraneis, esse rejectiones naturæ calidæ ab interioribus terræ. Calor enim et frigus, si fuerint in quanto minore, se invicem perimunt; sin fuerint in massis majoribus et tanquam justis exercitibus, tum vero per conflictum se locis invicem summovent et ejiciunt. Etiam tradunt cinamomum et odorifera, sita juxta latrinas et loca fœtida, diutius odorem retinere; quia recusant exire et commisceri cum fœtidis. Certe argentum vivum, quod alias se reuniret in corpus integrum, prohibetur per salivam hominis, aut axungiam porci, aut terebinthinam, et hujusmodi, ne partes ejus coëant; propter malum consensum quem habent cum hujusmodi corporibus; a quibus undique circumfusis se retrahunt; adeo ut fortior sit earum Fuga ab istis interjacentibus quam desiderium uniendi se cum partibus sui similibus; id quod vocant *mortificationem* argenti vivi. Etiam quod oleum cum aqua non misceatur, non tantum in causa est differentia levitatis, sed malus ipsorum consensus: ut videre est in spiritu vini, qui cum levior sit oleo, tamen se bene miscet cum aqua. At maxime omnium insignis est Motus Fugæ in nitro, et hujusmodi corporibus crudis, quæ flammam exhorrent; ut in pulvere pyrio, argento vivo, necnon

in auro. Fuga vero ferri ab altero polo magnetis a Gilberto bene notatur non esse Fuga propria, sed conformitas, et coitio ad situm magis accommodatum.[1]

Sit Motus Undecimus, Motus *Assimilationis*, sive *Multiplicationis sui*, sive etiam *Generationis Simplicis*. Generationem autem Simplicem dicimus non corporum integralium, ut in plantis, aut animalibus; sed corporum similarium.[2] Nempe per hunc motum corpora similaria vertunt corpora alia affinia, aut saltem bene disposita et præparata, in substantiam et naturam suam; ut flamma, quæ super halitus et oleosa multiplicat se, et generat novam flammam; aër, qui super aquam et aquea multiplicat se, et generat novum aërem; spiritus vegetabilis et animalis, qui super tenuiores partes tam aquei quam oleosi in alimentis suis multiplicat se, et generat novum spiritum; partes solidæ plantarum et animalium, veluti folium, flos, caro, os, et sic de cæteris, quæ singulæ ex succis alimentorum assimilant et generant substantiam successivam et epiusiam. Neque enim quenquam cum Paracelso delirare juvet, qui (distillationibus suis scilicet occæcatus) nutritionem per separationem tantum fieri voluit; quodque in pane vel cibo lateat oculus, nasus, cerebrum, jecur[3]; in succo terræ radix, folium, flos. Etenim sicut faber ex rudi massa lapidis vel ligni, per

[1] "Ita coitio magnetica actus est magnetis et ferri, non actio unius, utriusque ἐντελέχεια non ἔργον, συνεντελέχεια et conactus potius quam sympathia; antipathia nulla est proprie magnetica. Nam fuga et declinatio terminorum, sive conversio totius, utriusque actus est ad unitatem, a conactu et συνεντελέχεια amborum."— *Gilbert, De Magnete*, ii. c. 4.

[2] *i. e.* bodies of uniform texture.

[3] I have not been able to find any passage in Paracelsus which altogether corresponds to this remark; and in his *Modus Pharmacandi* the process of digestion is described without reference to the Archeus; nor is it said that each member "latet in pane vel cibo." "Hoc scimus, quod cujusque membri nutrimentum latitet in pane, carne, et in aliis similiter." "Quot vero modis et quibus, necnon quâ ratione membris corporis nutrimentum dividatur, nos ignoramus; hoc tantùm scimus, rem ita se habere ut diximus."— *De Mod. Pharm.* v. p. 233. (I use the edition of 1603).

Bacon has, however, correctly stated the general doctrine that alimentation is by separation; and again Paracelsus affirms that "officium vero Archei est in microcosmo purum ab impuro separare."—*De Morbis Tartareis*, iii. 195. The truth is that Paracelsus's views are so often repeated and varied in the course of his writings, that it is difficult to know how far his opinions are represented by any particular passage.

It is well to remark that, to a certain extent, the theory here so decidedly condemned has, by the recent progress of organic chemistry, been shown to be true. Nothing seems better established than that the nitrogenised components of animal bodies are derived from the corresponding elements of their food. With respect to fat, it is, I believe, a prevailing opinion at present, that animals have the power of converting into it the starch or sugar of their food; and the production of butyric acid by fermentation, has been regarded as at least an illustration of the transformation. One of the highest authorities on such a subject, however, I mean M. Boussangault, was, at least a few years ago, of a different opinion. He regarded animal fat as the representative of the fatty matters contained in the food.

separationem et rejectionem superflui educit folium, florem, oculum, nasum, manum, pedem, et similia; ita *archæum* illum fabrum internum ex alimento per separationem et rejectionem educere singula membra et partes asserit ille. Verum missis nugis, certissimum est partes singulas, tam similares quam organicas, in vegetabilibus et animalibus, succos alimentorum suorum fere communes, aut non multum diversos, primo attrahere cum nonnullo delectu, deinde assimilare, et vertere in naturam suam. Neque Assimilatio ista, aut Generatio Simplex, fit solum in corporibus animatis, verum et inanimata ex hac re participant; veluti de flamma et aëre dictum est. Quinetiam spiritus emortuus[1], qui in omni tangibili animato continetur, id perpetuo agit, ut partes crassiores digerat et vertat in spiritum, qui deinde exeat; unde fit diminutio ponderis et exsiccatio, ut alibi diximus. Neque etiam respuenda est in Assimilatione accretio illa, quam vulgo ab alimentatione distinguunt; veluti cum lutum inter lapillos concrescit, et vertitur in materiam lapideam; squammæ circa dentes vertuntur in substantiam non minus duram quam sunt dentes ipsi, etc. Sumus enim in ea opinione, inesse corporibus omnibus desiderium assimilandi, non minus quam coëundi ad homogenea; verum ligatur ista virtus, sicut et illa, licet non iisdem modis. Sed modos illos, necnon solutionem ab iisdem, omni diligentia inquirere oportet, quia pertinent ad senectutis refocillationem. Postremo videtur notatu dignum, quod in novem illis motibus, de quibus diximus, corpora tantum naturæ suæ conservationem appetere videntur; in hoc decimo autem propagationem.[2]

Sit Motus Duodecimus, Motus *Excitationis;* qui motus videtur esse ex genere Assimilationis, atque eo nomine quandoque a nobis promiscue vocatur. Est enim motus diffusivus, et communicativus, et transitivus, et multiplicativus, sicut et ille; atque effectu (ut plurimum) consentiunt, licet efficiendi

[1] By "spiritus emortuus" Bacon understands that which in the *Historia Vitæ et Mortis* he has called "spiritus mortualis." The fourth of his Canones Mobiles, in the *Historia*, &c. is this: — "In omnibus animatis duo sunt genera spirituum, spiritus mortuales quales insunt inanimatis, et superadditus spiritus vitalis." The former are such as "insunt in carne, osse, membranâ, et cæteris separatis et mortuis." I do not think there is any distinct trace of this doctrine of a spiritus mortualis in Paracelsus. In his tract *De Viribus Membrorum*, i. c. 1., he describes the functions of the spiritus vitæ in relation to the different organs, without referring to any indwelling non-vital spirit (vol. iii. p. 1. of his Philosophy).

[2] The first "motus" which Bacon mentions does not relate to concrete bodies ("corpora"), but to matter in general. The "Motus Assimilationis" is therefore the tenth of those which relate to "corpora," though it is the eleventh in the general arrangement.

modo et subjecto differant. Motus enim Assimilationis procedit tanquam cum imperio et potestate; jubet enim et cogit assimilatum in assimilantem verti et mutari. At Motus Excitationis procedit tanquam arte et insinuatione et furtim; et invitat tantum, et disponit excitatum ad naturam excitantis. Etiam Motus Assimilationis multiplicat et transformat corpora et substantias; veluti, plus fit flammæ, plus aëris, plus spiritus, plus carnis. At in Motu Excitationis, multiplicantur et transeunt virtutes tantum; et plus fit calidi, plus magnetici, plus putridi. Eminet autem iste motus præcipue in calido et frigido. Neque enim calor diffundit se in calefaciendo per communicationem primi caloris; sed tantum per Excitationem partium corporis ad motum illum qui est Forma Calidi; de quo in Vindemiatione Prima de Natura Calidi diximus. Itaque longe tardius et difficilius excitatur calor in lapide aut metallo quam in aëre, ob inhabilitatem et impromptitudinem corporum illorum ad motum illum; ita ut verisimile sit posse esse interius versus viscera terræ materias quæ calefieri prorsus respuant; quia ob condensationem majorem spiritu illo destituuntur a quo Motus iste Excitationis plerunque incipit. Similiter magnes induit ferrum nova partium dispositione et motu conformi; ipse autem nihil ex virtute perdit. Similiter fermentum panis, et flos cervisiæ, et coagulum lactis, et nonnulla ex venenis, excitant et invitant motum in massa farinaria, aut cervisia, aut caseo, aut corpore humano, successivum et continuatum; non tam ex vi excitantis quam ex prædispositione et facili cessione excitati.[1]

Sit Motus Decimus Tertius, Motus *Impressionis;* qui Motus est etiam ex genere Motus Assimilationis, estque ex diffusivis

[1] The theory here proposed is nearly equivalent to the most recent views on the same subject, as the following passage will sufficiently show.—It is obvious that both statements, however much of truth they may involve, are indefinite and unsatisfactory. It is not said whether the new properties engendered depend upon new types of motion or new arrangements, though the latter is probably Liebig's opinion.

"All the phenomena of fermentation, when taken together, establish the correctness of the principle long since recognised by Laplace and Berthollet, namely, *that an atom or molecule, put in motion by any power whatever, may communicate its own motion to another atom in contact with it.*

"This is a dynamical law of the most general application, manifested everywhere when the resistance or force opposing the motion, such as the vital principle, the force of affinity, electricity, cohesion, &c., is not sufficiently powerful to arrest the motion imparted.

"This law has only recently been recognised as a cause of the alterations in forms and properties which occur in our chemical combinations; and its establishment is the greatest and most enduring acquisition which chemical science has derived from the study of fermentation."—*Liebig's Letters on Chemistry*, p. 209.

motibus subtilissimus. Nobis autem visum est eum in speciem propriam constituere, propter differentiam insignem quam habet erga priores duos. Motus enim Assimilationis simplex corpora ipsa transformat; ita ut si tollas primum movens nihil intersit ad ea quæ sequuntur. Neque enim prima accensio in flammam, aut prima versio in aërem, aliquid facit ad flammam aut aërem in generatione succedentem. Similiter, Motus Excitationis omnino manet, remoto primo movente, ad tempora bene diuturna; ut in corpore calefacto, remoto primo calore; in ferro excito, remoto magnete; in massa farinaria, remoto fermento. At Motus Impressionis, licet sit diffusivus, et transitivus, tamen perpetuo pendere videtur ex primo movente; adeo ut sublato aut cessante illo statim deficiat et pereat; itaque etiam momento, aut saltem exiguo tempore, transigitur. Quare Motus illos Assimilationis et Excitationis, Motus *Generationis Jovis*, quia generatio manet, hunc autem motum Motum *Generationis Saturni*, quia natus statim devoratur et absorbetur, appellare consuevimus. Manifestat se vero hic motus in tribus; in lucis radiis; sonorum percussionibus; et magneticis, quatenus ad communicationem.[1] Etenim amota luce, statim pereunt colores et reliquæ imagines ejus; amota percussione prima et quassatione corporis inde facta, paulo post perit sonus. Licet enim soni etiam in medio per ventos tanquam per undas agitentur; tamen diligentius notandum est quod sonus non tam diu durat quam fit resonatio.[2] Etenim impulsa campana, sonus ad bene magnum tempus continuari videtur; unde quis facile in errorem labatur, si existimet toto illo tempore sonum tanquam natare et hærere in aëre; quod falsissimum est. Etenim illa resonatio non est idem sonus numero, sed renovatur. Hoc autem manifestatur ex sedatione sive cohibitione corporis percussi. Si enim sistatur et detineatur campana fortiter et fiat immobilis, statim perit sonus nec resonat amplius; ut in chordis, si post primam percussionem tangatur chorda, vel digito ut in lyra, vel calamo ut in espinetis, statim desinit resonatio. Magnete autem remoto statim ferrum decidit. Luna autem a mari non potest removeri; nec terra a ponderoso dum cadit. Itaque de illis nullum fieri potest experimentum; sed ratio eadem est.

Sit Motus Decimus Quartus, Motus *Configurationis*, aut *Si-*

[1] *i. e.* as regards the communication of influence.
[2] *i. e.* the original sound does not last all the time the resonance goes on.

tus; per quem corpora appetere videntur, non coitionem aut separationem aliquam, sed situm, et collocationem, et configurationem cum aliis. Est autem iste motus valde abstrusus, nec bene inquisitus. Atque in quibusdam videtur quasi incausabilis; licet revera (ut existimamus) non ita sit. Etenim si quæratur cur potius cœlum volvatur ab oriente in occidentem quam ab occidente in orientem; aut cur vertatur circa polos positos juxta Ursas potius quam circa Orionem, aut ex alia aliqua parte cœli; videtur ista quæstio tanquam quædam extasis, cum ista potius ab experientia, et ut positiva[1] recipi debeant. At in natura profecto sunt quædam ultima et incausabilia; verum hoc ex illis non esse videtur. Etenim hoc fieri existimamus ex quadam harmonia et consensu mundi, qui adhuc non venit in observationem.[2] Quod si recipiatur motus terræ ab occidente in orientem, eædem manent quæstiones. Nam et ipsa super aliquos polos movetur. Atque cur tandem debeant isti poli collocari magis ubi sunt quam alibi?[3] Item verticitas, et directio, et declinatio magnetis ad hunc motum referuntur. Etiam inveniuntur in corporibus tam naturalibus quam artificialibus, præsertim consistentibus et non fluidis, collatio quædam et positura partium, et tanquam villi et fibræ, quæ diligenter investigandæ sunt; utpote sine quarum inventione corpora illa commode tractari aut regi non possunt. At circulationes illas in liquidis, per quas illa dum pressa sint, antequam se liberare possunt, se invicem relevant, ut compressionem illam ex æquo tolerent, Motui Libertatis verius assignamus.

Sit Motus Decimus Quintus, Motus *Pertransitionis,* sive Motus *secundum Meatus;* per quem virtutes corporum magis aut minus impediuntur aut provehuntur a mediis ipsorum, pro natura corporum et virtutum operantium, atque etiam medii. Aliud enim medium luci convenit, aliud sono, aliud calori et frigori, aliud virtutibus magneticis, necnon aliis nonnullis respective.

[1] *i. e.* as merely positive facts.

[2] The most striking instance of this kind of harmony is the circumstance that all the movements of the solar system are in the same general direction, viz., from west to east. Laplace has attempted to calculate the probability that this uniformity is the result of a common cause determining the direction of their movements; but these numerical estimations of the probability of the truth of any induction are, on several accounts, altogether unsatisfactory.

[3] This passage shows that Bacon was not aware that the poles are not fixed (collocati) anywhere; in other words, that he was not acquainted with the precession of the equinoxes;— an additional proof how little of his attention had been given to mathematical physics.

Sit Motus Decimus Sextus, Motus *Regius* (ita enim eum appellamus) sive *Politicus;* per quem partes in corpore aliquo prædominantes et imperantes reliquas partes frænant, domant, subigunt, ordinant, et cogunt eas adunari, separari, consistere, moveri, collocari, non ex desideriis suis, sed prout in ordine sit et conducat ad bene esse partis illius imperantis; adeo ut sit quasi *Regimen* et *Politia* quædam, quam exercet pars regens in partes subditas. Eminet autem hic motus præcipue in spiritibus animalium, qui motus omnes partium reliquarum, quamdiu ipse in vigore est, contemperat. Invenitur autem in aliis corporibus in gradu quodam inferiore; quemadmodum dictum est de sanguine et urinis, quæ non solvuntur donec spiritus, qui partes earum commiscebat et cohibebat, emissus fuerit aut suffocatus. Neque iste motus omnino spiritibus proprius est, licet in plerisque corporibus spiritus dominentur ob motum celerem et penetrationem. Veruntamen in corporibus magis condensatis, nec spiritu vivido et vigente (qualis inest argento vivo et vitriolo) repletis, dominantur potius partes crassiores; adeo ut nisi frænum et jugum hoc arte aliqua excutiatur, de nova aliqua hujusmodi corporum transformatione minime sperandum sit. Neque vero quispiam nos oblitos esse existimet ejus quod nunc agitur; quia cum ista series et distributio motuum ad nil aliud spectet, quam ut illorum Prædominantia per Instantias Luctæ melius inquiratur, jam inter motus ipsos Prædominantiæ mentionem faciamus. Non enim in descriptione Motus istius Regii, de Prædominantia motuum aut virtutum tractamus, sed de Prædominantia partium in corporibus. Hæc enim ea est Prædominantia, quæ speciem istam motus peculiarem constituit.

Sit Motus Decimus Septimus, Motus *Rotationis Spontaneus;* per quem corpora motu gaudentia, et bene collocata, natura sua fruuntur, atque seipsa sequuntur, non aliud, et tanquam proprios petunt amplexus. Etenim videntur corpora aut movere sine termino; aut plane quiescere; aut ferri ad terminum, ubi pro natura sua aut rotent aut quiescant. Atque quæ bene collocata sunt, si motu gaudeant, movent per circulum: motu scilicet æterno, et infinito. Quæ bene collocata sunt, et motum exhorrent, prorsus quiescunt. Quæ non bene collocata sunt, movent in linea recta (tanquam tramite brevissimo) ad consortia suorum connaturalium.[1] Recipit autem Motus iste Rotationis

[1] This passage is wholly in accordance with the Peripatetic system of physics. But the modifications which Bacon goes on to enumerate, to which, as he conceives,

differentias novem. Primam, centri sui, circa quod corpora movent; secundam, polorum suorum, supra quos movent; tertiam, circumferentiæ sive ambitus sui, prout distant a centro; quartam, incitationis suæ, prout celerius aut tardius rotant; quintam, consequutionis motus sui, veluti ab oriente in occidentem, aut ab occidente in orientem; sextam, declinationis a circulo perfecto per spiras longius aut propius distantes a centro suo; septimam, declinationis a circulo perfecto per spiras longius aut propius distantes a polis suis; octavam, distantiæ propioris aut longioris spirarum suarum ad invicem; nonam et ultimam, variationis ipsorum polorum, si sint mobiles; quæ ipsa ad rotationem non pertinet, nisi fiat circulariter.[1] Atque iste motus communi et inveterata opinione habetur pro proprio cœlestium. Attamen gravis de illo motu lis est inter nonnullos tam ex antiquis quam modernis, qui Rotationem terræ attribuerunt. At multo fortasse justior movetur controversia (si modo res non sit omnino extra controversiam), an motus videlicet iste (concesso quod terra stet) cœli finibus contineatur, an potius descendat, et communicetur aëri et aquis. Motum autem Rotationis in missilibus, ut in spiculis, sagittis, pilis sclopetorum, et similibus, omnino ad Motum Libertatis rejicimus.

Sit Motus Decimus Octavus, Motus *Trepidationis*, cui (ut ab astronomis intelligitur) non multum fidei adhibemus.[2] Nobis

the eternal circular motions of the heavenly bodies may be subject, are sufficient to destroy the whole *à priori* argument in favour of such a system of astronomy as that which we find in the twelfth book of the *Metaphysics*. It has not been sufficiently observed that the Ptolemaic system is no less at variance with the Peripatetic philosophy than the heliocentrical. The attempts of Turrianus and Fracastorius to construct what may be called an orthodox system of astronomy—that is one in which all the motions should take place in circles of which the earth is the centre—was suggested chiefly, as we learn from the *Homocentrica* of the latter, by the wish to reconcile astronomy and philosophy. It had no scientific value, since it left all the phenomena of variations of parallax and apparent diameter unexplained, or, at any rate, gave an explanation of them which no astronomer would accept. It was nevertheless favourably received by the systematic Peripaticians. See, for instance, Flaminius, *De prima Philosoph. Paraph.* p. 119. (I quote the Basle edition of 1557.)

[1] I believe the sense is that unless we restrict ourselves to circular motion, that is, unless we reject the sixth and seventh species of variation, it will not be necessary for us to suppose the poles themselves to be movable: in other words, that the phenomena of which we could by this hypothesis give an account may be adequately represented without it by means of spirals.

[2] The name of trepidation was given by the Alphonsine astronomers to a motion by which they imagined the starry heaven to be affected, and in virtue of which its equinoxes described small circles of nine degrees radius about those of the ninth or next superior orb. To account for this motion they introduced a tenth orb. The phenomenon, however, thus accounted for was altogether imaginary, although it is true that the length of the tropical year, by supposed variations of which the idea of trepidation was suggested, is not rigorously constant. It may be questioned whether Bacon's hesitation to accept the astronomical motion of trepidation had any better foundation than his doubts whether the proper motions of the planetary orbs were

autem corporum naturalium appetitus ubique serio perscrutantibus occurrit iste motus; et constitui debere videtur in speciem. Est autem hic motus veluti æternæ cujusdam captivitatis. Videlicet ubi corpora non omnino pro natura sua bene locata, et tamen non prorsus male se habentia, perpetuo trepidant, et irrequiete se agant, nec statu suo contenta, nec ulterius ausa progredi. Talis invenitur motus in corde et pulsibus animalium; et necesse est ut sit in omnibus corporibus, quæ statu ancipiti ita degunt inter commoda et incommoda, ut distracta liberare se tentent, et denuo repulsam patiantur, et tamen perpetuo experiantur.

Sit Motus Decimus Nonus et postremus, motus ille cui vix nomen motus competit, et tamen est plane motus. Quem motum, Motum *Decubitus*, sive Motum *Exhorrentiæ Motus*, vocare licet. Per hunc motum terra stat mole sua, moventibus se extremis suis in medium; non ad centrum imaginativum, sed ad unionem. Per hunc etiam appetitum omnia majorem in modum condensata motum exhorrent, atque illis pro omni appetitu est non moveri; et licet infinitis modis vellicentur et provocentur ad motum, tamen naturam suam (quoad possunt) tuentur. Quod si ad motum compellantur, tamen hoc agere semper videntur ut quietem et statum suum recuperent, neque amplius moveant. Atque circa hoc certe se agilia præbent, et satis perniciter et rapide (ut pertæsa et impatientia omnis moræ) contendunt. Hujus autem appetitus imago ex parte tantum cerni potest; quia hic apud nos, ex subactione et concoctione cœlestium [1], omne tangibile non tantum non condensatum est ad ultimitatem, sed etiam cum spiritu nonnullo miscetur.

Proposuimus itaque jam species sive elementa simplicia motuum, appetituum, et virtutum activarum, quæ sunt in natura maxime catholica. Neque parum scientiæ naturalis sub illis adumbratum est. Non negamus tamen et alias species fortasse addi posse, atque istas ipsas divisiones secundum veriores rerum venas transferri, denique in minorem numerum posse redigi. Neque tamen hoc de divisionibus aliquibus abstractis intelligimus: veluti si quis dicat corpora appetere vel

anything more than "res conflictæ et suppositæ." The question of the existence or non-existence of trepidation could only be decided by a person conversant with the details of the received system of astronomy.

[1] In illustration of this phrase, see note I. p. 267.

conservationem, vel exaltationem, vel propagationem, vel fruitionem naturæ suæ; aut si quis dicat motus rerum tendere ad conservationem et bonum, vel universi, ut Antitypiam et Nexum; vel universitatum magnarum, ut Motus Congregationis Majoris, Rotationis, et Exhorrentiæ Motus; vel formarum specialium, ut reliquos. Licet enim hæc vera sint, tamen nisi terminentur in materia et fabrica secundum veras lineas, speculativa sunt, et minus utilia. Interim sufficient et boni erunt usus ad pensitandas Prædominantias virtutum et exquirendas Instantias Luctæ; id quod nunc agitur.

Etenim ex his quos proposuimus motibus alii prorsus sunt invincibiles; alii aliis sunt fortiores, et illos ligant, frænant, disponunt; alii aliis longius jaculantur; alii alios tempore et celeritate prævertunt; alii alios fovent, roborant, ampliant, accelerant.

Motus Antitypiæ omnino est adamantinus et invincibilis. Utrum vero Motus Nexus sit invincibilis adhuc hæremus. Neque enim pro certo affirmaverimus utrum detur Vacuum, sive coacervatum sive permistum.[1] At de illo nobis constat, rationem illam, propter quam introductum est Vacuum a Leucippo et Democrito (videlicet quod absque eo non possent eadem corpora complecti et implere majora et minora spatia), falsam esse. Est enim plane *plica materiæ* complicantis et replicantis se per spatia, inter certos fines, absque interpositione Vacui; neque est in aëre ex vacuo bis millies (tantum enim esse oportet) plus quam in auro.[2] Id quod ex potentissimis

[1] "Vacuum permistum," *κενὸν ἀχώριστον*, is vacuum diffused through the interstices of any portion of matter. By "vacuum coacervatum," *κενὸν κεχωρισμένον*, is meant clear empty space. See, for this distinction, Aristotle, *Phys.* iv. 7. Hero of Alexandria, whom Bacon mentions more than once, approves of those who admit the former kind of vacuum and reject the latter. See the Introduction to his *Spiritalia*.

[It is perhaps worth observing that in the fable entitled "Cupido sive Atomus (*De Sap. Vet.* xvii.), where the theory of a vacuum is mentioned, this distinction was not introduced till Bacon revised the work in his later years. The passage which stands thus in the original edition (1609)—"Quisquis autem atomum ponit et vacuum, necessario virtutem atomi ad distans introducit"—is altered, in the edition published by Rawley after Bacon's death, to "Quisquis autem atomum asserit atque vacuum (licet istud vacuum intermistum ponat, non segregatum) necessario," &c.—*J. S.*]

[2] "Ex vacuo bis millies" is to be rendered "two thousand times as much of vacuity." Bacon (vid. suprà, II. 50.) thought spirit of wine a hundred times denser than its own vapour, and gold twenty-one times denser than spirit of wine. In the *Historia Densi et Rari*, he remarks that air is at least a hundred-fold rarer than water; and from the table there given it appears that the specific density of gold is to that of water as 1000 to 56, nearly. Hence he must have estimated the density of gold at 1900-fold that of air. Now, if we take the same weight of air and of gold, it is clear that, neglecting the space occupied by the solid matter, supposed equally dense, of each, the ratio of their densities is the same as that of the "vacua permista" which they respectively contain, and that if we take the solid matter into account the "ex

corporum pneumaticorum virtutibus (quæ aliter tanquam pulveres minuti natarent in vacuo), et multis aliis demonstrationibus, nobis satis liquet. Reliqui vero Motus regunt et reguntur invicem, pro rationibus vigoris, quanti, incitationis, ejaculationis, necnon tum auxiliorum tum impedimentorum quæ occurrunt.

Exempli gratia: magnes armatus nonnullus detinet et suspendit ferrum, ad sexagecuplum pondus ipsius; eo usque dominatur Motus Congregationis Minoris super Motum Congregationis Majoris; quod si majus fuerit pondus, succumbit. Vectis tanti roboris sublevabit tantum pondus; eo usque dominatur Motus Libertatis super Motum Congregationis Majoris; sin majus fuerit pondus, succumbit. Corium tensum ad tensuram talem non rumpitur; eo usque dominatur Motus Continuationis super Motum Tensuræ; quod si ulterior fuerit tensura, rumpitur corium, et succumbit Motus Continuationis. Aqua per rimam perforationis talis effluit; eo usque dominatur Motus Congregationis Majoris super Motum Continuationis; quod si minor fuerit rima, succumbit, et vincit Motus Continuationis. In pulvere sulphuris solius immissi [1] in sclopetum cum pila, et admoto igne, non emittitur pila; in eo Motus Congregationis Majoris vincit Motum Hyles. At in pulvere pyrio immisso vincit Motus Hyles in sulphure, adjutus Motibus Hyles et Fugæ in nitro. Et sic de cæteris. Etenim Instantiæ Luctæ (quæ indicant Prædominantiam Virtutum, et secundum quas rationes et calculos prædominentur et succumbant) acri et sedula diligentia undique sunt conquirendæ.

Etiam modi et rationes ipsius succumbentiæ motuum diligenter sunt introspiciendæ. Nempe, an omnino cessent, vel potius usque nitantur, sed ligentur. Etenim in corporibus hic apud nos, nulla vera est quies, nec in integris nec in partibus; sed tantum secundum apparentiam. Quies autem ista apparens causatur aut per Æquilibrium, aut per absolutam Prædominantiam Motuum. Per Æquilibrium, ut in bilancibus, quæ stant si æqua sint pondera. Per Prædominantiam, ut in hydriis perforatis, ubi quiescit aqua, et detinetur a decasu, per

vacuo" in the case of air must bear a larger ratio than that of the densities to the "ex vacuo" of gold; so that we may take it in round numbers to be as two thousand to one, as in the text.

The passage is important as showing that Bacon, notwithstanding his frequent mention of Democritus, did not adopt the atomic philosophy, though he did not absolutely reject the physical part of it.

[1] [So in the original edition.] The true reading seems to be "immisso."

Prædominantiam Motus Nexus. Notandum tamen est (ut diximus) quatenus nitantur motus illi succumbentes. Etenim si quis per luctam detineatur extensus in terra, brachiis et tibiis vinctis, aut aliter detentis; atque ille tamen totis viribus resurgere nitatur; non est minor nixus, licet non proficiat. Hujus autem rei conditio (scilicet utrum per Prædominantiam motus succumbens quasi annihiletur, an potius continuetur nixus, licet non conspiciatur), quæ latet in conflictibus, apparebit fortasse in concurrentiis. Exempli gratia; fiat experimentum in sclopetis, utrum sclopetus, pro tanto spatio quo emittat pilam in linea directa, sive (ut vulgo loquuntur) in puncto blanco, debiliorem edat percussionem ejaculando in supra, ubi Motus Ictus est simplex, quam desuper, ubi Motus Gravitatis concurrit cum Ictu.

Etiam canones Prædominantiarum qui occurrunt colligendi sunt. Veluti, quod quo communius est bonum quod appetitur, eo Motus est fortior: ut Motus Nexus, qui respicit communionem universi, fortior est Motu Gravitatis, qui respicit communionem densorum. Etiam quod appetitus qui sunt boni privati, non prævalent plerunque contra appetitus boni magis publici, nisi in parvis quantis. Quæ utinam obtinerent in civilibus.

XLIX.

Inter Prærogativas Instantiarum ponemus loco vicesimo quinto *Instantias Innuentes;* eas scilicet, quæ commoda hominum innuunt aut designant. Etenim ipsum *Posse* et ipsum *Scire* naturam humanam amplificant, non beant. Itaque decerpenda sunt ex universitate rerum ea quæ ad usus vitæ maxime faciunt. Verum de iis erit magis proprius dicendi locus, cum *Deductiones ad Praxim* tractabimus. Quinetiam in ipso opere Interpretationis circa singula subjecta, locum semper *Chartæ Humanæ*, sive *Chartæ Optativæ*, assignamus. Etenim et quærere et optare non inepte, pars scientiæ est.

L.

Inter Prærogativas Instantiarum ponemus loco vicesimo sexto *Instantias Polychrestas.* Eæ sunt, quæ pertinent ad varia et sæpius occurrunt; ideoque operæ et novis probationibus haud parum parcunt. Atque de instrumentis ipsis atque ingeniationibus proprius erit dicendi locus, cum Deductiones ad Praxim et Experimentandi Modos tractabimus. Quinetiam quæ adhuc cognita sunt et in usum venerunt, in Historiis Particularibus

singularum artium describentur. In præsenti autem subjungemus quædam catholica circa ea pro exemplis tantum Polychresti.

Operatur igitur homo super corpora naturalia (præter ipsam admotionem et amotionem corporum simplicem) septem præcipue modis: nempe, vel per exclusionem eorum quæ impediunt et disturbant; vel per compressiones, extensiones, agitationes, et hujusmodi; vel per calorem et frigus; vel per moram in loco convenienti; vel per frænum et regimen motus; vel per consensus speciales; vel per alternationem tempestivam et debitam, atque seriem et successionem horum omnium; aut saltem nonnullorum ex illis.

Ad primum igitur quod attinet; aër communis qui undique præsto est et se ingerit, atque radii cœlestium, multum turbant. Quæ itaque ad illorum exclusionem faciunt, merito haberi possint pro Polychrestis. Huc igitur pertinent materies et crassities vasorum, in quibus corpora ad operationem præparata reponuntur. Similiter, modi accurati obturationis vasorum, per consolidationem et *lutum sapientiæ*, ut loquuntur chymici. Etiam clausura per liquores in extimis, utilissima res est; ut cum infundunt oleum super vinum aut succos herbarum, quod expandendo se in summitate instar operculi, optime ea conservat illæsa ab aëre. Neque pulveres res malæ sunt; qui, licet contineant aërem permistum, tamen vim aëris coacervati et circumfusi arcent; ut fit in conservatione uvarum et fructuum intra arenam, et farinam. Etiam cera, mel, pix, et hujusmodi tenacia, recte obducuntur ad clausuram perfectiorem, et ad summovendum aërem et cœlestia. Etiam nos experimentum quandoque fecimus, ponendo vas, necnon aliqua alia corpora, intra argentum vivum, quod omnium longe densissimum est ex iis quæ circumfundi possunt. Quinetiam specus et cavernæ subterraneæ magni usus sunt ad prohibendum insolationem et aërem istum apertum prædatorium; qualibus utuntur Germani Septentrionales pro granariis. Necnon repositio corporum in fundo aquarum ad hoc spectat, ut memini me quippiam audisse de utribus vini demissis in profundum puteum, ad infrigidationem scilicet; sed casu et per neglectum ac oblivionem ibidem remanentibus per multos annos, et deinde extractis; unde vinum factum est non solum non vapidum aut emortuum, sed multo magis nobile ad gustum, per commixtionem partium suarum (ut videtur) magis exquisitam. Quod si postulet res ut corpora demittantur

ad fundum aquarum, veluti intra fluvios aut mare, neque tamen aquas tangant, nec in vasibus obturatis concludantur, sed aëre tantum circumdentur; bonus est usus vasis illius quod adhibitum est nonnunquam ad operandum subter aquis super navigia demersa, ut urinatores diutius manere possint sub aquis, et per vices ad tempus respirare. Illud hujusmodi erat. Conficiebatur dolium ex metallo concavum, quod demittebatur æquabiliter ad superficiem aquæ, atque sic deportabat totum aërem qui continebatur in dolio secum in fundum maris. Stabat autem super pedes tres (instar tripodis), qui longitudinis erant aliquanto minoris statura hominis; ita ut urinator posset cum anhelitus deficeret, immittere caput in cavum dolii, et respirare, et deinde opus continuare. Atque audivimus inventam esse jam machinam aliquam naviculæ aut scaphæ, quæ homines subter aquis vehere possit ad spatia nonnulla.[1] Verum sub tali vase, quale modo diximus, corpora quævis facile suspendi possint; cujus causa hoc experimentum adduximus.

Est et alius usus diligentis et perfectæ clausuræ corporum: nempe, non solum ut prohibeatur aditus aëris per exterius (de quo jam dictum est), verum etiam ut cohibeatur exitus spiritus corporis, super quod fit operatio per interius. Necesse est enim ut operanti circa corpora naturalia constet de summis suis: viz. quod nihil expirarit aut effluxerit. Fiunt enim profundæ alterationes in corporibus, quando, natura prohibente annihilationem, ars prohibeat etiam deperditionem aut evolationem alicujus partis. Atque hac de re invaluit opinio falsa (quæ si vera esset, de ista conservatione summæ certæ absque diminutione esset fere desperandum): viz. spiritus corporum, et aërem majori gradu caloris attenuatum, nullis vasorum claustris posse contineri, quin per poros vasorum subtiliores evolent. Atque in hanc opinionem adducti sunt homines per vulgata illa experimenta, poculi inversi super aquam cum candela aut charta inflammata, ex quo fit ut aqua sursum attrahatur; atque similiter ventosarum, quæ super flammam calefactæ trahunt carnes. Existimant enim in utroque experimento aërem attenuatum emitti, et inde *quantum* ipsius minui, ideoque aquam aut carnes per Nexum succedere. Quod falsissimum est. Aër

[1] According to Beckmann, the first distinct mention of the diving-bell, at least in modern times, is to be found in Fainsius, as quoted by Schott. Fainsius gives an account of some Greeks who exhibited a diving-bell at Toledo, before Charles the Fifth and his court, in 1538.

enim non *quanto* diminuitur, sed spatio contrahitur; neque incipit motus iste successionis aquæ, antequam fiat extinctio flammæ aut refrigeratio aëris; adeo ut medici, quo fortius attrahant ventosæ, ponant spongias frigidas[1] aqua madefactas super ventosas. Itaque non est cur homines multum sibi metuant de facili exitu aëris aut spirituum. Licet enim verum sit etiam solidissima corpora habere suos poros, tamen ægre patitur aër aut spiritus comminutionem sui ad tantam subtilitatem; quemadmodum et aqua exire recusat per rimam minusculam.

De secundo vero modo ex septem prædictis illud imprimis notandum est, valere certe compressiones et hujusmodi violentias ad motum localem, atque alia id genus, potentissime; ut in machinis et missilibus; etiam ad destructionem corporis organici, atque earum virtutum quæ consistunt plane in motu. Omnis enim vita, immo etiam omnis flamma et ignitio destruitur per compressiones; ut et omnis machina corrumpitur et confunditur per easdem. Etiam ad destructionem virtutum quæ consistunt in posituris, et dissimilaritate partium paulo crassiore; ut in coloribus (neque enim idem color floris integri et contusi, neque succini integri et pulverizati); etiam in saporibus (neque enim idem sapor pyri immaturi, et ejusdem compressi ac subacti; nam manifesto dulcedinem majorem concipit). Verum ad transformationes et alterationes nobiliores corporum similarium non multum valent istæ violentiæ; quia corpora per eas non acquirunt consistentiam aliquam novam constantem et quiescentem, sed transitoriam, et nitentem semper ad restitutionem et liberationem sui. Attamen non abs re foret hujus rei facere experimenta aliqua diligentiora; ad hoc scilicet, utrum condensatio corporis bene similaris (qualia sunt aër, aqua, oleum, et hujusmodi), aut rarefactio similiter per violentiam indita, possint fieri constantes et fixæ et quasi mutatæ in naturam. Id quod primo experiendum per moram simplicem; deinde per auxilia et consensus. Atque illud nobis in promptu fuisset (si modo in mentem venisset), cum aquam (de qua alibi) per malleationes et pressoria condensavimus, antequam erumperet. Debueramus enim sphæram complanatam per aliquot dies sibi permisisse, et tum demum aquam extraxisse; ut fieret experimentum, utrum statim impletura fuisset talem dimensionem, qualem habebat ante condensationem. Quod si non fecisset aut statim, aut certe

[1] The right reading is doubtless "frigidâ;" but the sense is obvious.

paulo post, constans videlicet facta videri potuisset ista condensatio; sin minus, apparuisset factam fuisse restitutionem, et compressionem fuisse transitoriam. Etiam simile quiddam faciendum erat circa extensionem aëris in ovis vitreis. Etenim debuerat fieri, post exuctionem fortem, subita et firma obturatio; deinde debuerant ova illa manere ita obturata per nonnullos dies; et tum demum experiendum fuisset, utrum aperto foramine attractus fuisset aër cum sibilo, aut etiam attracta fuisset tanta quantitas aquæ post immersionem, quanta fuisset ab initio, si nulla adhibita fuisset mora. Probabile enim, aut saltem dignum probatione est, hæc fieri potuisse et posse; propterea quod in corporibus paulo magis dissimilaribus similia efficiat mora temporis. Etenim baculum per compressionem curvatum post aliquod tempus non resilit; neque id imputandum est alicui deperditioni ex quanto ligni per moram; nam idem fiet in lamina ferri (si augeatur mora), quæ non est expirabilis. Quod si non succedat experimentum per moram simplicem, tamen non deserendum est negotium, sed auxilia alia adhibenda. Non enim parum lucri fit, si per violentias indi possint corporibus naturæ fixæ et constantes. Hac enim ratione aër possit verti in aquam per condensationes, et complura alia id genus. Dominus enim est homo motuum violentorum, magis quam cæterorum.

At tertius ex septem modis, refertur ad magnum illud organum, tam naturæ quam artis, quoad operandum; videlicet calidum et frigidum. Atque in hac parte claudicat plane potentia humana, tanquam ex uno pede. Habemus enim calorem ignis, qui caloribus solis (prout ad nos deferuntur) et caloribus animalium quasi infinitis partibus potentior est et intensior. At deest frigus, nisi quale per tempestates hyemales, aut per cavernas, aut per circundationes nivis et glaciei, haberi potest: quod in comparatione æquari potest cum calore fortasse solis meridiano in regione aliqua ex torridis, aucto insuper per reverberationes montium et parietum; nam hujusmodi utique tam calores quam frigora ab animalibus ad tempus exiguum tolerari possunt. Nihili autem sunt fere præ calore fornacis ardentis, aut alicujus frigoris quod huic gradui respondeat. Itaque omnia hic apud nos vergunt ad rarefactionem, et desiccationem, et consumptionem: nihil fere ad condensationem et intenerationem, nisi per misturas et modos quasi spurios. Quare Instantiæ Frigoris omni diligentia sunt conquirendæ; quales videntur inveniri in expositione corporum super turres quando

gelat acriter; in cavernis subterraneis; circundationibus nivis et glaciei in locis profundioribus, et ad hoc excavatis; demissione corporum in puteos; sepulturis corporum in argento vivo et metallis; immersione corporum in aquis, quæ vertunt ligna in lapides; defossione corporum in terra (qualis fertur apud Chinenses esse confectio porcellanæ, ubi massæ ad hoc factæ dicuntur manere intra terram per quadraginta aut quinquaginta annos, et transmitti ad hæredes, tanquam mineræ quædam artificiales); et hujusmodi. Quinetiam quæ interveniunt in natura condensationes, factæ per frigora, similiter sunt investigandæ; ut, causis eorum cognitis, transferri possint in artes. Quales cernuntur in exudatione marmoris et lapidum; in rorationibus super vitra per interius fenestrarum, sub auroram, post gelu noctis; in originibus et collectionibus vaporum in aquas sub terra, unde sæpe scaturiunt fontes; et quæcunque sunt hujus generis.

Inveniuntur autem, præter illa quæ sunt frigida ad tactum, quædam alia potestate frigida, quæ etiam condensant; veruntamen operari videntur super corpora animalium tantum, et vix ultra. Hujus generis se ostendunt multa in medicinis et emplastris. Alia autem condensant carnes et partes tangibiles; qualia sunt medicamenta astringentia, atque etiam inspissantia; alia condensant spiritus; id quod maxime cernitur in soporiferis. Duplex autem est modus condensationis spirituum, per medicamenta soporifera, sive provocantia somnum: alter per sedationem motus; alter per fugam spirituum. Etenim viola, rosa sicca, lactuca, et hujusmodi benedicta sive benigna, per vapores suos amicos et moderate refrigerantes, invitant spiritus ut se uniant, et ipsorum acrem et inquietum motum compescunt. Etiam aqua rosacea, apposita ad nares in deliquiis animæ, spiritus resolutos et nimium relaxatos se recipere facit, et tanquam alit. At opiata et eorum affinia spiritus plane fugant, ex qualitate sua maligna et inimica. Itaque si applicentur parti exteriori, statim aufugiunt spiritus ab illa parte, nec amplius libenter influunt: sin sumantur interius, vapores eorum, ascendentes ad caput, spiritus in ventriculis cerebri contentos undequaque fugant; cumque se retrahant spiritus neque in aliam partem effugere possint, per consequens coëunt et condensantur; et quandoque plane extinguuntur et suffocantur; licet rursus eadem opiata moderate sumpta, per accidens secundarium (videlicet condensationem illam quæ a coitione succedit),

confortent spiritus, eosque reddant magis robustos, et retundant eorum inutiles et incensivos[1] motus, ex quo ad curas morborum, et vitæ prolongationem haud parum conferant.

Etiam præparationes corporum ad excipiendum Frigus non sunt omittendæ; veluti quod aqua parum tepida facilius conglacietur quam omnino frigida, et hujusmodi.

Præterea, quia natura Frigus tam parce suppeditat, faciendum est quemadmodum pharmacopolæ solent; qui quando simplex aliquod haberi non possit, capiunt succedaneum ejus, et *quid* pro *quo*, ut vocant; veluti lignum aloes pro xylobalsamo[2], cassiam pro cinamomo. Simili modo diligenter circumspiciendum est, si quæ sint succedanea frigoris; videlicet quibus modis fieri possint condensationes in corporibus, aliter quam per frigus, quod illas efficit ut opus suum proprium. Illæ autem condensationes videntur intra quaternum numerum (quantum adhuc liquet) contineri. Quarum prima videtur fieri per contrusionem simplicem; quæ parum potest ad densitatem constantem (resiliunt enim corpora) sed nihilominus forte res auxiliaris esse queat. Secunda fit per contractionem partium crassiorum in corpore aliquo, post evolationem aut exitum partium tenuiorum, ut fit in indurationibus per ignem, et repetitis extinctionibus metallorum, et similibus. Tertia fit per coitionem partium homogenearum, quæ sunt maxime solidæ in corpore aliquo, atque antea fuerant distractæ, et cum minus solidis commistæ: veluti in restitutione mercurii sublimati, qui in pulvere longe majus occupat spatium quam mercurius simplex, et similiter in omni repurgatione metallorum a scoriis suis. Quarta fit per consensus, admovendo quæ ex vi corporum occulta condensant; qui consensus adhuc raro se ostendunt; quod mirum minime est, quoniam antequam inventio succedat Formarum et Schematismorum, de inquisitione consensuum[3] non multum sperandum est. Certe quoad corpora animalium, dubium non est quin sint complures medicinæ, tam interius quam exterius sumptæ, quæ condensant tanquam per consensum, ut paulo ante diximus. Sed in inanimatis rara est hujusmodi operatio. Percrebuit sane, tam scriptis quam fama, narratio de arbore in una ex insulis sive Terceris sive Canariis (neque enim bene memini), quæ perpetuo stillat; adeo ut inhabitantibus nonnullam commodi-

[1] Exciting.

[2] Xylobalsamum is the technical name of the twigs of the tree which yields the balm of Gilead.

[3] Consensus is equivalent to *συμπάθεια*.

tatem aquæ præbeat.[1] Paracelsus autem ait, herbam vocatam *Rorem Solis* meridie et fervente sole rore impleri, cum aliæ herbæ undique sint siccæ.[2] At nos utramque narrationem fabulosam esse existimamus. Omnino autem illæ instantiæ nobilissimi forent usus, et introspectione dignissimæ, si essent veræ. Etiam rores illos mellitos, et instar mannæ, qui super foliis quercus inveniuntur mense Maio, non existimamus fieri et densari a consensu aliquo, sive a proprietate folii quercus; sed cum super aliis foliis pariter cadant, contineri scilicet et durare in foliis quercus quia sunt bene unita, nec spongiosa, ut plurima ex aliis.

Calorem vero quod attinet, copia et potestas nimirum homini abunde adest; observatio autem et inquisitio deficit in nonnullis, iisque maxime necessariis, utcunque spagyrici se venditent. Etenim caloris intensioris opificia exquiruntur et conspiciuntur; remissioris vero, quæ maxime in vias naturæ incidunt, non tentantur, ideoque latent. Itaque videmus per vulcanos istos qui in pretio sunt, spiritus corporum magnopere exaltari, ut in aquis fortibus, et nonnullis aliis oleis chymicis; partes tangibiles indurari, et emisso volatili, aliquando figi; partes homogeneas separari; etiam corpora heterogenea grosso modo incorporari et commisceri; maxime autem compages corporum compositorum et subtiliores schematismos destrui et confundi. Debuerant autem opificia caloris lenioris tentari et exquiri; unde subtiliores misturæ et schematismi ordinati gigni possint et educi, ad exemplum naturæ et imitationem operum solis; quemadmodum in aphorismo de Instantiis Fœderis quædam adumbravimus. Opificia enim naturæ transiguntur per longe minores portiones, et posituras magis exquisitas et varias, quam opificia ignis, prout nunc adhibetur. Tum vero videatur homo revera auctus potestate, si per calores et potentias artificiales opera naturæ possint specie repræsentari, virtute perfici, copia variari; quibus addere oportet accelerationem temporis. Nam rubigo ferri longo tempore procedit, at versio in crocum

[1] This wonderful tree is described in Jonston's *Dendrographia*, published at Frankfort in 1669. See book the tenth, c. 4. One of the authorities he refers to is Cardan (De variet. rerum), from whom not improbably Bacon derived the story. The tree is said to be found in the island of Ferro. Cardan, with more than usual caution, remarks, at the close of the account he gives of it: "Sed postquam hoc tot scriptores affirmant, fieri potest ut tale aliquid contingat, sed modus nondum perspectus est."— *De rerum variet.* vi. c. 22. Compare *Oviedo in Ramusio*, iii. 71. a.

[2] I have not been able to find this in Paracelsus. It seems, however, to accord with his theory of dew,— namely, that it is an exudation from the sun and stars; the suppression of which would lead to the formation of additional suns.

Martis subito; et similiter de ærugine et cerussa; christallum longo tempore conficitur, vitrum subito conflatur; lapides longo tempore concrescunt, lateres subito coquuntur, etc. Interim (quod nunc agitur) omnes diversitates caloris cum effectibus suis respective diligenter et industrie undique sunt colligendæ et exquirendæ: cœlestium, per radios suos directos, reflexos, refractos, et unitos in speculis comburentibus; fulguris, flammæ, ignis carbonum; ignis ex diversis materiis; ignis aperti, conclusi, angustiati et inundantis, denique per diversas fabricas fornacium qualificati; ignis flatu exciti, quieti et non exciti; ignis ad majorem aut minorem distantiam remoti; ignis per varia media permeantis: calorum humidorum, ut balnei Mariæ[1], fimi, caloris animalium per exterius, caloris animalium per interius, fœni conclusi: calorum aridorum, cineris, calcis, arenæ tepidæ; denique calorum cujusvis generis cum gradibus eorum.

Præcipue vero tentanda est inquisitio et inventio effectuum et opificiorum caloris accedentis et recedentis graduatim, et ordinatim, et periodice, et per debita spatia et moras. Ista enim inæqualitas ordinata revera filia cœli[2] est, et generationis mater; neque a calore aut vehementi, aut præcipiti, aut subsultorio, aliquid magni expectandum est. Etenim et in vegetabilibus hoc manifestissimum est; atque etiam in uteris animalium magna est caloris inæqualitas, ex motu, somno, alimentationibus et passionibus fœmellarum quæ uterum gestant; denique in ipsis matricibus terræ, iis nimirum in quibus metalla et fossilia efformantur, locum habet et viget ista inæqualitas. Quo magis notanda est inscitia aliquorum alchymistarum ex reformatis[3], qui per calores æquabiles lampadum et hujusmodi, perpetuo uno tenore ardentium, se voti compotes fore existimarunt. Atque de opificiis et effectibus caloris hæc dicta sint. Neque vero tempestivum est illa penitus scrutari antequam Rerum Formæ et Corporum Schematismi ulterius investigati fuerint, et in lucem prodierint. Tum enim quærenda et adoperanda et aptanda sunt instrumenta, quando de exemplaribus constiterit.

[1] This is properly "balneum maris;" that is, a mode of communicating heat to any substance by putting it into a vessel which is placed in another containing water. The latter being put on the fire, the former and its contents become gradually and moderately heated. The reason of the name is obvious. From "balneum maris" the French made by a kind of translation (the final *s* not being sounded) "bain marie;" and the form in the text is, I think, merely a retranslation of the French phrase, the meaning of the second word being mistaken. Balneum Mariæ is however, I believe, a common phrase with old writers on chemistry.

[2] *i. e.* of the heavens, physically; because of the varying warmth of the seasons.

[3] *i. e.* of the reformed school.

Quartus modus operandi est per moram, quæ certe et promus et condus naturæ est, et quædam dispensatrix. Moram appellamus, cum corpus aliquod sibi permittitur ad tempus notabile, munitum interim et defensum ab aliqua vi externa. Tum enim motus intestini se produnt et perficiunt, cum motus extranei et adventitii cessant. Opera autem ætatis sunt longe subtiliora quam ignis. Neque enim possit fieri talis clarificatio vini per ignem, qualis fit per moram; neque etiam incinerationes per ignem tam sunt exquisitæ, quam resolutiones et consumptiones per sæcula. Incorporationes etiam, et mistiones subitæ et præcipitatæ per ignem, longe inferiores sunt illis, quæ fiunt per moram. At dissimilares et varii schematismi, quos corpora per moras tentant (quales sunt putredines), per ignem aut calorem vehementiorem destruuntur. Illud interim non abs re fuerit notare; motus corporum penitus conclusorum habere nonnihil ex violento. Incarceratio enim illa impedit motus spontaneos corporis. Itaque mora in vase aperto plus facit ad separationes; in vase penitus clauso ad commistiones; in vase nonnihil clauso, sed subintrante aëre, ad putrefactiones; utcunque de opificiis et effectibus moræ undique sunt diligenter conquirendæ instantiæ.

At regimen motus (quod est quintus ex modis operandi) non parum valet. Regimen autem motus vocamus, cum corpus aliud occurrens corporis alterius motum spontaneum impedit, repellit, admittit, dirigit. Hoc vero plerunque in figuris et situ vasorum consistit. Etenim conus erectus juvat ad condensationem vaporum in alembicis; at conus inversus juvat ad defæcationem sacchari in vasis resupinatis. Aliquando autem sinuatio requiritur[1], et angustiatio, et dilatatio per vices, et hujusmodi. Etiam omnis percolatio huc spectat; scilicet cum corpus occurrens, uni parti corporis alterius viam aperit, alteri obstruit. Neque semper percolatio aut aliud regimen motus fit per extra; sed etiam per corpus in corpore: ut cum lapilli immittuntur in aquas ad colligendam limositatem ipsarum; syrupi clarificantur cum albuminibus ovorum, ut crassiores partes adhærescant, et postea separari possint. Etiam huic regimini motus satis leviter et inscite attribuit Telesius figuras animalium, ob rivulos scilicet et loculos matricis.[2] Debuerat

[1] As in a still.

[2] Telesius's doctrine of the formation of the embryo is essentially the same as Galen's, namely that a system of arteries &c. must be first of all formed in the germ,

autem notare similem efformationem in testis ovorum, ubi non sunt rugæ aut inæqualitas. At verum est regimen motus efformationes perficere in modulis et proplasticis.[1]

Operationes vero per consensus aut fugas (qui sextus modus est) latent sæpenumero in profundo. Istæ enim (quas vocant) proprietates occultæ, et specificæ, et sympathiæ, et antipathiæ, sunt magna ex parte corruptelæ philosophiæ. Neque de consensibus rerum inveniendis multum sperandum est, ante inventionem Formarum et schematismorum simplicium. Consensus enim nil aliud est quam symmetria Formarum et Schematismorum ad invicem.

Atqui majores et magis catholici rerum consensus non prorsus obscuri sunt. Itaque ab iis ordiendum. Eorum prima et summa diversitas ea est; ut quædam corpora copia et raritate materiæ admodum discrepent, schematismis consentiant: alia contra copia et raritate materiæ consentiant, schematismis discrepent. Nam non male notatum est a chymicis, in principiorum suorum triade, sulphur et mercurium[2] quasi per universitatem rerum permeare. (Nam de sale inepta ratio est, sed introducta ut possit comprehendere corpora terrea, sicca, et fixa.) At certe in illis duobus videtur consensus quidam naturæ ex maxime catholicis conspici. Etenim consentiunt sulphur; oleum, et exhalatio pinguis; flamma; et fortasse corpus stellæ. Ex altera parte consentiunt mercurius; aqua et vapores aquei; aër; et fortasse æther purus et interstellaris. Attamen istæ quaterniones geminæ, sive magnæ rerum tribus (utraque intra ordines suos) copia materiæ atque densitate immensum differunt, sed schematismo valde conveniunt; ut in plurimis se produnt. At contra metalla diversa copia et densitate multum conveniunt (præsertim respectu vegetabilium, etc.), sed schematismo multifariam differunt; et similiter vegetabilia et animalia diversa schematismis quasi infinitis variantur, sed

and that these, by applying themselves to corresponding parts on the surface of the matrix, determine the channels through which nourishment is supplied, and therefore (mediately) the development of the different members of the fœtus. But it does not seem that he would have admitted that the smoothness of the shells of eggs was an objection to his theory. At any rate, he illustrates it by reference to the appearances presented by an egg opened during incubation. *De rerum naturâ*, vi. c. 4. and 40.

[1] The proper word for what we call a model is "proplasma," which is used in a Latin form by Pliny. I have not seen any authority for such an adjective as "proplasticus." What Bacon means is not exactly a model, but a mould for casting.

[2] This triad is the fundamental point of Paracelsus's chemical and medical philosophy. See his works throughout, and particularly the tract *De tribus primis essentiis*, contained in the third book of his philosophical works.

intra copiam materiæ sive densitatem paucorum graduum continentur.

Sequitur consensus maxime post priorem catholicus, videlicet corporum principalium et fomitum suorum; videlicet menstruorum[1], et alimentorum. Itaque exquirendum, sub quibus climatibus, et in qua tellure, et ad quam profunditatem metalla singula generentur; et similiter de gemmis, sive ex rupibus, sive inter mineras natis; in qua gleba terræ, arbores singulæ, et frutices, et herbæ potissimum proveniant, et tanquam gaudeant; et insimul quæ impinguationes, sive per stercorationes cujuscunque generis, sive per cretam, arenam maris, cineres, etc., maxime juvent; et quæ sint ex his pro varietate glebarum magis aptæ et auxiliares. Etiam insitio et inoculatio arborum et plantarum, earumque ratio, quæ scilicet plantæ super quas fœlicius inserantur, etc., multum pendet de consensu. In qua parte non injucundum foret experimentum quod noviter audivimus esse tentatum, de insitione arborum sylvestrium (quæ hucusque in arboribus hortensibus fieri consuevit), unde folia et glandes majorem in modum amplificantur, et arbores fiunt magis umbrosæ. Similiter, alimenta animalium respective notanda sunt in genere, et cum negativis. Neque enim carnivora sustinent herbis nutriri; unde etiam Ordo Folitanorum (licet voluntas humana plus possit quam animantium cæterorum super corpus suum), post experientiam factam (ut aiunt), tanquam ab humana natura non tolerabilis, fere evanuit.[2] Etiam materiæ

[1] By "menstrua" are meant the substances out of which any species of mineral is generated, or, in other words, the causa materialis of its existence. See, on the generation of metals and other minerals, the fourth and fifth books of Agricola's work *De ortu et causis fossilium*. He gives an account of the opinions of Aristotle, Theophrastus, &c. In modern chemistry the word menstruum is nearly equivalent to solvent. By the school of Paracelsus the word is used so vaguely that it is difficult to determine what idea they attached to it, or how they derived their sense of the word from its original signification. When the word is used as in the text, the metaphor seems to be taken from the Aristotelian theory of generation, in which *κατὰ τὴν πρώτην ὑλήν. ἐστιν ἡ τῶν κατσμηνίων φύσις.*

[2] Bacon doubtless refers to the austerities of the order of Feüillans. Jean de la Barrière, after holding the Cistercian abbey of Feüillans in commendam for eleven years, renounced the world in 1573, and in the course of a few years introduced a most austere rule of life into the abbey of which he was the head. His monks knelt on the floor during their refections, and some of them were in the habit of drinking out of skulls. They abstained from eggs, fish, butter, oil, and even salt, and confined themselves to pottage made of herbs boiled in water, and bread so coarse and black that beasts refused to eat of it. After a while they gave up wine also. Clement VIII. permitted the society to draw up constitutions for the establishment of their rule. By these the excessive rigour of their way of life was checked, which was done in obedience to the Pope, and in consequence of the deaths of fourteen monks in a single week at Feüillans. These constitutions were ratified in 1595. Assuming, of which there seems no doubt, that the Folitani of Bacon are the Feüillans, I may

diversæ putrefactionum, unde animalcula generantur, notandæ sunt.

Atque consensus corporum principalium erga subordinata sua (tales enim ii possint censeri quos notavimus) satis in aperto sunt. Quibus addi possunt sensuum consensus erga objecta sua. Qui consensus cum manifestissimi sint; bene notati et acriter excussi, etiam aliis consensibus qui latent magnam præbere possint lucem.

At interiores corporum consensus et fugæ, sive amicitiæ et lites (tædet enim nos fere vocabulorum sympathiæ et antipathiæ, propter superstitiones et inania), aut falso ascriptæ, aut fabulis conspersæ, aut per neglectum raræ admodum sunt. Etenim si quis asserat inter vineam et brassicam esse dissidium, quia juxta sata minus læte proveniunt, præsto ratio est[1]: quod utraque planta succulenta sit et deprædatrix, unde altera alteram defraudat. Si quis asserat esse consensum et amicitiam inter segetes et cyaneum, aut papaver sylvestre, quia herbæ illæ fere non proveniunt nisi in arvis cultis: debuit is potius asserere dissidium esse inter ea, quia papaver et cyaneus emittuntur et creantur ex tali succo terræ qualem segetes reliquerint et repudiaverint; adeo ut satio segetum terram præparet ad eorum proventum. Atque hujusmodi falsarum ascriptionum magnus est numerus. Quoad fabulas vero, illæ omnino sunt exterminandæ. Restat tenuis certe copia eorum consensuum, qui certo probati sunt experimento; quales sunt magnetis et ferri, atque auri et argenti vivi, et similium. At in experimentis chymicis circa metalla inveniuntur et alii nonnulli observatione digni. Maxima vero frequentia eorum (ut in tanta paucitate) invenitur in medicinis nonnullis, quæ ex proprietatibus suis occultis (quas vocant) et specificis, respiciunt aut membra, aut

remark that the latinised form of Feüillans used is Fuliensis, as an adjective; the proper style of the society being "Congregatio Cistertiomonastica B. Mariæ Fuliensis." I have not seen the work of Morotius to which Helyot, from whom the preceding account is taken, refers; but in that of C. Henrique, also mentioned by Helyot, I do not find any authority for *Folitani*. It is probable that Bacon's chief information on the subject was gathered orally during his residence in France, before the Feüillans had ceased from their first love. The expression "ordo . . . fere evanuit" must be taken to mean that the severe rule that they had at first was given up. See Helyot, *Hist. des Ordres Monastiques*, ivme partie, c. 38. Spondanus, *An.* 1586, iv. For some particulars of the early history of the Abbey of Feüillans, and especially for the will of Jean de la Barrière, see *Voyage Littéraire de deux Bénédictins*," ii. p. 16.

[1] On account apparently of this enmity between the vine and the cabbage, the latter was thought to prevent intoxication. See Lemmius, *De occultis naturæ miraculis*, ii. 17. On the subject of similar enmities, see the same work, iv. 10.; or Cardan's treatise, *De rerum varietate*, and particularly the *Theatrum sympatheticum*.

humores, aut morbos, aut quandoque naturas individuas. Neque omittendi sunt consensus inter motus et affectus lunæ et passiones corporum inferiorum, prout ex experimentis agriculturæ, nauticæ, et medicinæ, aut alias cum delectu severo et sincero colligi et recipi possint. Verum instantiæ universæ consensuum secretiorum quo magis sunt infrequentes, eo majori cum diligentia sunt inquirendæ, per traditiones, et narrationes fidas et probas; modo hoc fiat absque ulla levitate, aut credulitate, sed fide anxia et quasi dubitabunda. Restat consensus corporum modo operandi tanquam inartificialis, sed usu polychrestus, qui nullo modo omittendus est, sed sedula observatione investigandus. Is est coitio sive unio corporum, proclivis aut difficilis, per compositionem, sive appositionem simplicem. Etenim corpora nonnulla facile et libenter commiscentur et incorporantur, alia autem ægre et perverse: veluti pulveres melius incorporantur cum aquis; calces et cineres, cum oleis; et sic de similibus. Neque tantum sunt colligendæ instantiæ propensionis aut aversionis corporum erga misturam, sed etiam collocationis partium, et distributionis, et digestionis, postquam commista sint; denique et prædominantiæ post misturam transactam.

Superest ultimo loco ex modis septem operandi, septimus et postremus; operatio scilicet per alternationem et vicissitudines priorum sex; de quo antequam in singulos illos paulo altius fuerit inquisitum, tempestivum non foret exempla proponere. Series autem sive catena hujusmodi alternationis, prout ad singula effecta accommodari possit, res est et cognitu maxime difficilis, et ad opera maxime valida. Summa autem detinet et occupat homines impatientia hujusmodi tam inquisitionis, quam praxeos; cum tamen sit instar fili labyrinthi, quoad opera majora. Atque hæc sufficiant ad exemplum Polychresti.

LI.

Inter Prærogativas Instantiarum, ponemus loco vicesimo septimo atque ultimo *Instantias Magicas.* Hoc nomine illas appellamus, in quibus materia aut efficiens tenuis aut parva est, pro magnitudine operis et effectus qui sequitur; adeo ut etiamsi fuerint vulgares, tamen sint instar miraculi; aliæ primo intuitu, aliæ etiam attentius contemplanti. Has vero natura ex sese subministrat parce; quid vero factura sit sinu excusso, et post inventionem Formarum, et Processuum, et Schematismorum, futuris temporibus apparebit. At ista effecta Magica

(quantum adhuc conjicimus) fiunt tribus modis: aut per multiplicationem sui, ut in igne, et venenis, quæ vocant specifica; necnon in motibus, qui transeunt et fortificantur de rota in rotam; aut per excitationem sive invitationem in altero, ut in magnete, qui excit acus innumeras, virtute nullatenus deperdita aut diminuta; aut in fermento, et hujusmodi; aut per anteversionem motus, ut dictum est de pulvere pyrio, et bombardis, et cuniculis: quorum priores duo modi indagationem consensuum requirunt; tertius, mensuræ motuum. Utrum vero sit aliquis modus mutandi corpora per minima (ut vocant), et transponendi subtiliores materiæ schematismos (id quod ad omnimodas corporum transformationes pertinet, ut ars brevi tempore illud facere possit, quod natura per multas ambages molitur), de eo nulla hactenus nobis constant indicia. Quemadmodum autem in solidis et veris aspiramus ad ultima et summa; ita vana et tumida perpetuo odimus, et quantum in nobis est profligamus.

LII.

Atque de Dignitatibus sive Prærogativis Instantiarum hæc dicta sint. Illud vero monendum, nos in hoc nostro Organo tractare logicam, non philosophiam. Sed cum logica nostra doceat intellectum et erudiat ad hoc, ut non tenuibus mentis quasi claviculis rerum abstracta captet et prenset (ut logica vulgaris), sed naturam revera persecet, et corporum virtutes et actus, eorumque leges in materia determinatas inveniat; ita ut non solum ex natura mentis, sed ex natura rerum quoque hæc scientia emanet; mirum non est, si ubique naturalibus contemplationibus et experimentis, ad exempla artis nostræ, conspersa fuerit et illustrata. Sunt autem (ut ex iis quæ dicta sunt patet) Prærogativæ Instantiarum numero 27; nominibus, Instantiæ Solitariæ: Instantiæ Migrantes: Instantiæ Ostensivæ: Instantiæ Clandestinæ: Instantiæ Constitutivæ: Instantiæ Conformes: Instantiæ Monodicæ: Instantiæ Deviantes: Instantiæ Limitaneæ: Instantiæ Potestatis: Instantiæ Comitatus et Hostiles: Instantiæ Subjunctivæ: Instantiæ Fœderis: Instantiæ Crucis: Instantiæ Divortii: Instantiæ Januæ: Instantiæ Citantes: Instantiæ Viæ: Instantiæ Supplementi: Instantiæ Persecantes: Instantiæ Virgæ: Instantiæ Curriculi: Doses Naturæ: Instantiæ Luctæ: Instantiæ Innuentes: Instantiæ Polychrestæ: Instantiæ Magicæ. Usus autem harum instantiarum, in quo instantias vulgares excellunt, versatur in genere

aut circa partem informativam; aut circa operativam; aut circa utramque. Atque quoad informativam, juvant illæ aut sensum, aut intellectum. Sensum, ut quinque Instantiæ Lampadis: Intellectum, aut accelerando Exclusivam Formæ, ut Solitariæ; aut angustiando et propius indicando Affirmativam Formæ, ut Migrantes, Ostensivæ, Comitatus, cum Subjunctivis; aut erigendo intellectum, et ducendo ad genera et naturas communes; idque aut immediate, ut Clandestinæ, Monodicæ, Fœderis; aut gradu proximo, ut Constitutivæ; aut gradu infimo, ut Conformes; aut rectificando Intellectum a consuetis, ut Deviantes; aut ducendo ad Formam Magnam, sive Fabricam Universi[1], ut Limitaneæ; aut cavendo de Formis et causis falsis, ut Crucis et Divortii. Quod vero ad Operativam attinet; illæ practicam aut designant; aut mensurant; aut sublevant. Designant aut ostendendo a quibus incipiendum, ne actum agamus, ut Instantiæ Potestatis; aut ad quid aspirandum, si detur facultas, ut Innuentes: mensurant quatuor illæ Mathematicæ: sublevant Polychrestæ et Magicæ.

Rursus ex istis instantiis 27, nonnullarum (ut superius diximus de aliquibus) facienda est collectio jam ab initio, nec expectanda particularis inquisitio naturarum. Cujus generis sunt Instantiæ Conformes, Monodicæ, Deviantes, Limitaneæ, Potestatis, Januæ, Innuentes, Polychrestæ, Magicæ. Hæ enim aut auxiliantur et medentur intellectui et sensui, aut instruunt praxin in genere. Reliquæ tum demum conquirendæ sunt, cum conficiemus Tabulas Comparentiæ ad opus Interpretis circa aliquam naturam particularem. Sunt enim instantiæ Prærogativis istis insignitæ et donatæ animæ instar, inter vulgares instantias comparentiæ; et ut ab initio diximus, paucæ illarum sunt vice multarum; quocirca cum Tabulas conficimus, illæ omni studio sunt investigandæ, et in Tabulas referendæ. Erit etiam earum mentio necessaria in iis quæ sequuntur. Præponendus itaque erat earum tractatus. Nunc vero ad adminicula et rectificationes Inductionis, et deinceps ad concreta, et Latentes Processus, et Latentes Schematismos, et reliqua quæ Aphorismo 21. ordine proposuimus, pergendum; ut tandem (tanquam curatores probi et fideles) tradamus hominibus fortunas suas emancipato intellectu, et facto tanquam majore; unde necesse est sequi emendationem status hominis, et ampliationem

[1] That is, the constitution (or cosmos) of the universe.

potestatis ejus super naturam. Homo enim per lapsum et de statu innocentiæ decidit, et de regno in creaturas. Utraque autem res etiam in hac vita nonnulla ex parte reparari potest; prior per religionem et fidem, posterior per artes et scientias. Neque enim per maledictionem facta est creatura prorsus et ad extremum rebellis. Sed in virtute illius diplomatis[1], *In sudore vultus comedes panem tuum*, per labores varios (non per disputationes certe, aut per otiosas ceremonias magicas) tandem et aliqua ex parte ad panem homini præbendum, id est, ad usus vitæ humanæ subigitur.

[1] "Diploma" may be rendered "charter."

Finis Libri Secundi Novi Organi

PARASCEVE

AD

HISTORIAM
NATURALEM ET EXPERIMENTALEM.

[Published in 1620 in the same volume with the *Novum Organum.*]

PREFACE.

AMONG the eight subjects which were to have been handled in the remaining books of the *Novum Organum* (see ii. 21.), the last but one is entitled *De parascevis ad inquisitionem*, under which head Bacon intended (as appears by the introduction to the following treatise) to set forth the character of the *Natural and Experimental History*, which was to form the third part of the Instauratio.

What may have been the logical connexion between these eight subjects which determined him to reserve this for the penultimate place, it seems impossible, by the help of the titles alone, to divine. But whatever the order in which he thought advisable to approach it, there can be no doubt that this Natural and Experimental History was always regarded by him as a part of his system both fundamental and indispensable. So earnestly indeed and so frequently does he insist on the importance of it, that I once believed it to be the one real novelty which distinguished his philosophy from those of his contemporaries and immediate predecessors. And even now, though Mr. Ellis's analysis of the Baconian Induction has given me much new light and considerably modified my opinion in that matter, I am still inclined to think that Bacon himself regarded it not only as a novelty, but as *the* novelty from which the most important results were to be expected; and however experience may have proved that his expectations were in great part vain and his scheme impracticable, I cannot help suspecting that more of it is practicable than has yet been attempted, and that the greatest results of science are still to be looked for from a further proceeding in this direction.

The grounds of this opinion will be explained most conveniently in connexion with the following treatise; a treatise published by Bacon (on account of the exceeding importance of the subject) out of its proper place and incomplete; and to

which I find nothing among Mr. Ellis's papers that can serve as preface.

In what the distinctive peculiarity of the Baconian philosophy really consisted, is a question to which every fresh inquirer gives a fresh answer. Before I was acquainted with Mr. Ellis's, which is the latest, and formed upon the largest survey and subtlest scrutiny of the evidence, I had endeavoured to find one for myself, and had come to a conclusion which, though quite different from his, is not I think irreconcilable with it, but contains (as I still venture to believe) a part, though a part only, of the truth. And the question which I wish now to raise is whether, as my solution was imperfect from not taking any account of the novelty contained in the *method of Induction* as Bacon understood it, Mr. Ellis's be not likewise imperfect from not taking sufficient account of the novelty contained in the *Natural History* as Bacon intended it to be employed; and whether there be not room for a third solution more complete than either, as including both.

That the philosophy which Bacon meant to announce was in some way essentially different not only from any that had been before but from any that has been since, is a position from which in both cases the inquiry sets out; and since it is one which will not perhaps be readily granted by everybody, it may be worth while to explain the considerations which led me to it; the rather because Mr. Ellis and myself, though proceeding not only independently but by entirely different roads and in pursuit of different objects — he endeavouring to penetrate the secret of Bacon's philosophy, I endeavouring to understand the objects and purposes of his life — meet nevertheless at this point in the same conclusion.

The process by which I arrived at it myself, I cannot explain better than by transcribing a paper which I wrote on the subject in 1847; at which time I had not seen any part of Mr. Ellis's argument, or heard his opinion upon the question at issue. What my own opinion is now, I will state afterwards; but first I give the paper exactly as I then wrote it; the length of the extract being justified — at least if there be any truth in the conclusion — by the importance of the question at issue; for it bears upon the business of the present and future quite as much as on the knowledge of the past. The form in which

it is written, — that of a familiar conversation between two friends, — happened to be the most convenient for the business I was then about; and as I could not present the argument more clearly in any other, I leave it as it is.

A.

Before you go on I wish you would satisfy me on one point, upon which I have hitherto sought satisfaction in vain. What after all was it that Bacon did for philosophy? In what did the wonder and in what did the benefit consist? I know that people have all agreed to call him the Father of the Inductive Philosophy; and I know that the sciences made a great start about his time and have in some departments made great progress since. But I could never yet hear what one thing he discovered that would not have been discovered just as soon without his help. It is admitted that he was not fortunate in any of his attempts to apply his principles to practice. It is admitted that no actual scientific discovery of importance was made by him. Well, he might be the father of discovery for all that. But among all the important scientific discoveries which have been made by others since his time, is there any one that can be traced to his teaching? traced to any principles of scientific investigation originally laid down by him, and by no other man before him or contemporary with him? I know very well that he did lay down a great many just principles; — principles which must have been acted upon by every man that ever pursued the study of Nature with success. But what of that? It does not follow that we *owe* these principles to him. For I have no doubt that I myself, — I that cannot tell how we know that the earth goes round, or why an apple falls or why the antipodes do not fall, — I have no doubt (I say) that if I sat down to devise a course of investigation for the determination of these questions, I should discover a great many just principles which Herschel and Faraday must hereafter act upon, as they have done heretofore. Nay if I should succeed in setting them forth more exactly, concisely, impressively, and memorably, than any one has yet done, they might soon come to be called *my* principles. But if that were all, I should have done little or nothing for the advancement of science. I should only have been finding for some of its processes a better name. I want to know whether Bacon did anything more than this; and if so, what. In what did the principles laid down by him essentially differ from those on which (while he was thus labouring to expound them) Galileo was already acting? From all that I can hear, it seems evident that the Inductive Philosophy received its great impulse, not from the great prophet of new principles, but from the great discoverers of new facts; not from Bacon,

but from Galileo and Kepler. And I suppose that, with regard to those very principles even, if you wanted illustrations of what is commonly called the Baconian method, you would find some of the very best among the works of Gilbert and Galileo. What was it then that Bacon did which entitles him to be called the Regenerator of Philosophy? or what was it that he dreamt he was doing which made him think the work so entirely his own, so immeasurably important, and likely to be received with such incredulity by at least one generation of mankind?

B.

A pertinent question; for there is no doubt that he was under that impression. "*Cum argumentum hujusmodi præ manibus habeam* (says he) *quod tractandi imperitiâ perdere et veluti exponere* NEFAS *sit.*" He was persuaded that the argument he had in charge was of such value, that to risk the loss of it by unskilful handling would be not only a pity but an impiety. You wish to know, and the wish is reasonable, what it was. For answer I would refer you to the philosophers; only I cannot say that their answers are satisfactory to myself. The old answer was that Bacon was the first to break down the dominion of Aristotle. This is now, I think, generally given up. His opposition to Aristotle was indeed conceived in early youth, and (though he was not the first to give utterance to it) I dare say it was not the less his own, and in the proper sense of the word, original. But the real overthrower of Aristotle was the great stir throughout the intellectual world which followed the Reformation and the revival of learning. It is certain that his authority had been openly defied some years before the publication of Bacon's principal writings; and it could not in the nature of things have survived much longer. Sir John Herschel however, while he freely admits that the Aristotelian philosophy had been effectually overturned without Bacon's aid, still maintains Bacon's title to be looked upon in all future ages as the great Reformer of Philosophy; not indeed that he *introduced* inductive reasoning as a new and untried process, but on account of his "keen perception and his broad and spirit-stirring, almost enthusiastic, announcement of its paramount importance, as the alpha and omega of science, as the grand and only chain for linking together of physical truths, and the eventual key to every discovery and every application."

A.

That is all very fine; but it seems to me rather to account for his having the title than to justify his claim to it; — rather to explain how he comes by his reputation than to prove that he deserves it. Try the question upon a modern case. We are now standing upon

the threshold of a new era in the science of History. It is easy to see that the universal study of History must be begun afresh upon a new method. Tales, traditions, and all that has hitherto been accounted most authentic in our knowledge of past times, must be set aside as doubtful; and the whole story must be spelt out anew from charters, names, inscriptions, monuments, and such like contemporary records. Now an eloquent man might easily make a broad and spirit-stirring announcement of the paramount importance of this process, as the only key by which the past can be laid open to us as it really was,— the grand and only chain for linking historical truths and so forth. But would he thereby entitle himself to be called the great reformer of History? Surely not. Such a man might perhaps get the credit, but it is Niebuhr that has done the thing: for Niebuhr was the first both to see the truth and to set the example.

B.

So, I confess, it seems to me. And if I thought that Bacon had aimed at no more than that, I should not think that his time had been altogether well employed, or his sense of the importance of his own mission to mankind altogether justified. For surely a single great discovery made by means of the inductive process would have done more to persuade mankind of the paramount importance of it, than the most eloquent and philosophical exposition. Therefore in forsaking his experiments about gravitation, light, heat, &c., in order to set forth his classification of the "Prerogatives of Instances," and to lay down general principles of philosophy, he would have been leaving the effectual promotion of his work to secure the exaltation of his name, than which nothing could be more opposite both to his principles and his practice. If his ambition had been only to have his picture stand as the frontispiece of the new philosophy, he could not have done better indeed than come forward as the most eloquent expounder of its principles. But if he wanted (as undoubtedly he did above all other things) to set it on work and bring it into fashion, his business was to produce the most striking illustration of its powers, — the most striking practical proof of what it could do.

Therefore if I thought, as Herschel seems to think, that there was no essential or considerable difference between the doctrines which Bacon preached and those which Galileo practised; — that Galileo was as the Niebuhr of the new philosophy (according to your own illustration), and Bacon only as your supposed eloquent man; — I should agree with you that Bacon's right to be called the Reformer of Philosophy is not made out. But when I come to look at Bacon's own exposition of his views and compare them with the latest and most approved account I have met with of Galileo's

works, I cannot but think that the difference between what Galileo was doing and what Bacon wanted to be done is not only essential but immense.

A.

Nay, if the difference be immense, how comes it to be overlooked? It is from no want of the wish to claim for Bacon all the credit he deserves in that line.

B.

No. Rather perhaps from the wish to claim too much. We are so anxious to give him his due that we must needs ascribe to him all that has been done since his time; from which it seems to follow that we are practising his precepts, and that the Baconian philosophy has in fact been flourishing among us for the last 200 years. You believe this, don't you?

A.

People tell me so; and I suppose the only doubt is whether it be exclusively and originally his; — there is no doubt, I fancy, that it *is* his.

B.

Certainly that appears to be the general opinion; and it may seem an audacious thing in me to say that it is a mistake. But I cannot help it. It is true that a new philosophy is flourishing among us which was born about Bacon's time; and Bacon's name (as the brightest which presided at the time of its birth) has been inscribed upon it.

"Hesperus, that led
The starry host, rode brightest:"

not that Hesperus did actually *lead* the other stars; he and they were moving under a common force, and they would have moved just as fast if he had been away; but because he shone brightest, he *looked* as if he led them. But if I may trust Herschel, I must think that it is the *Galilean* philosophy that has been flourishing all these years; and if I may trust my own eyes and power of construing Latin, I must think that the *Baconian* philosophy has yet to come.

If Bacon were to reappear among us at the next meeting of the Great British Association, — or say rather if he had appeared there two or three years ago (for there seems to be something great and new going on now), I think he would have shaken his head. I think he would have said, "Here has been a great deal of very good diligence used by several persons; but it has not been used upon a well-laid plan. These solar systems, and steam-engines, and Daguerreotypes, and electric telegraphs, are so many more pledges of what might be expected from an instauration of philosophy such as I re-

commended more than 200 years ago; why have you not tried that? You have been acting all the time like a king who should attempt to conquer a country by encouraging private adventurers to make incursions each on his own account, without any system of combined movements to subdue and take possession. I see that wherever you have the proper materials and plenty of them your work is excellent; so was Gilbert's in my time; so was Galileo's; nay even Kepler — though his method was as unskilful as that of the boy who in doing a long-division sum would first guess at the quotient and then multiply it into the divisor to see whether it were true, and if it came out wrong would make another guess and multiply again, and so on till he guessed right at last, — yet because he had a copious collection of materials ready to his hand, and enormous perseverance however perversely applied, and a religious veracity, did at last hit upon one of the greatest discoveries ever made by one man. But what could Kepler have done without Tycho Brahe's tables of observation? And what might Galileo not have done if he had had a large enough collection of facts? This therefore it is that disappoints me. I do not see any sufficient collection made of materials, — that is, of facts in nature — or any effectual plan on foot for making one. You are scarcely better off in that respect than I was; you have each to gather the materials upon which you are to work. You cannot build houses, or weave shirts, or learn languages so. If the builder had to make his own bricks, the weaver to grow his own flax, the student of a dead language to make his own concordance, where would be your houses, your shirts, or your scholars? And by the same rule if the interpreter of Nature is to forage for his facts, what progress can you expect in the art of interpretation? Your scholar has his dictionary provided to his hand; but your natural philosopher has still to make his dictionary for himself.

"And I wonder the more at this, because this is the very thing of all others which I myself pointed out as absolutely necessary to be supplied, — as the thing which was to be set about in the first place, — the thing *without* which no great things could possibly be done in philosophy. And since you have done me the honour to think so very highly of my precepts, I am a little surprised that you have not thought it worth while in so very essential a point to follow them. And to say the truth, I could wish for my own reputation (if that were of any consequence) that you had either honoured me a little more in that way, or not honoured me quite so much in other ways. You call me the Father of your Philosophy, meaning it for the greatest compliment you can pay. I thank you for the compliment, but I must decline the implied responsibility. I assure you this is none of mine. — May I ask whether any attempt has been

made to collect that '*Historiam naturalem et experimentalem quæ sit in ordine ad condendam philosophiam*,' concerning which I did certainly give some very particular directions; — which I placed as conspicuously as I could in the very front and entrance of my design; — of which I said that all the genius and meditation and argumentation in the world could not do instead of it; no, not if all men's wits could meet in one man's head; therefore that this we must have, or else the business must be given up?[1] — If this has been fairly tried and found impracticable or ineffectual, blot me out of your books as a dreamer that thought he had found out a great thing but it turned out nothing. If not, I still think it would be worth your while to try it."

A.

I partly comprehend your meaning; but I should prefer it in a less dramatic form. You think that the difference between what Galileo did and what Bacon wanted to be done, lay in this — that Bacon's plan presupposed a history (or dictionary as you call it) of Universal Nature, as a storehouse of facts to work upon; whereas Galileo was content to work upon such facts and observations as he collected for himself. But surely this is only a difference in degree. Both used the facts in the same way; only Bacon wanted a larger collection of them.

B.

Say rather, Bacon wanted a collection large *enough* to give him the command of all the avenues to the secrets of Nature. You might as well say that there is only a difference of degree between the method of the man who runs his single head against a fortress, and the man who raises a force strong enough to storm it,—because each uses the force he has in the same way, only one wants more of it than the other: — or between stopping *all* the leaks in a vessel and stopping as many as you conveniently can. The truth is, that though the difference between *a few* and *a few more* is only a difference of degree, the difference between *enough* and *not enough* is a difference in kind. According to Galileo's method, the work at best could be done but partially. According to Bacon's (so at least he believed) it would be done effectually and altogether.

I will put you a case by way of illustration. Two men (call them James and John) find a manuscript in a character unknown to either of them. James, being skilled in languages and expert at making out riddles, observes some characters similar to those of one of the

[1] Neque huic labori et inquisitioni et mundanæ perambulationi, ulla ingenii aut meditationis aut argumentationis substitutio aut compensatio sufficere potest, non si omnia omnium ingenia coierint. Itaque aut hoc prorsus habendum aut negotium in perpetuum deserendum.

languages which he understands; immediately sets himself to guess what they are; and succeeds in puzzling out here a name and there a date, with plausibility. Each succeeding guess, if it be right, makes the next easier; and there is no knowing precisely how much may be made out in this manner, or with what degree of certainty. The process is inductive, and the results, so far as they go, are discoveries. John seeing him thus employed comes up and says: "This is all very ingenious and clever, and far more than I could do by the same process. But you are not going the right way to work. You will never be able to decipher the manuscript in this way. I will tell you what we must do. Here (you see) are certain forms of character which continually recur. Here is one that comes more than once in every line; here another that comes once in every two or three lines; a third that comes only twice or thrice in a page; and so on. Let us have a list made of these several forms, with an index showing where and how often they occur. In the meantime I will undertake, upon a consideration of the general laws of language, to tell you, by the comparative frequency of their recurrence, what parts of speech most of these are. So we shall know which of them are articles, which conjunctions, which relatives, which auxiliaries, and so on. Setting these apart we shall be better able to deal with the nouns and verbs; and then by comparing the passages in which each occurs, we shall be able, with the help of your language learning, to make out the meaning first of one, then of another. As each is determined, the rest will be easier to determine; and by degrees we shall come to know them all. It is a slow process compared with yours, and will take time and labour and many hands. But when it is done we shall be able to read the whole book."

Here I think you have a picture in little of the difference between Bacon's project for the advancement of philosophy and that which was carried into effect (certainly with remarkable success) by the new school of inductive science which flourished in his time. If we want to pursue the parallel further, we have only to suppose that John, after completing in a masterly manner a great portion of his work on the universal laws of language; after giving particular directions for the collection, arrangement, and classification of the index, and even doing several pages of it himself by way of example; is called away, and obliged to leave the completion of the work to his successors; and that his successors (wanting diligence to finish, patience to wait, or ability to execute) immediately fall back to the former method; — in which they make such progress and take such pride, that they never think of following out John's plan, but leave it exactly where he left it. And here I think you have a true picture of the state in which the matter now rests.

A.

I see. The manuscript is the volume of Nature. The learned linguist and expert maker-out of puzzles is Galileo or one of his school. The work on the laws of language is the *Novum Organum.* The index is the Natural and experimental History *quæ sit in ordine ad condendam Philosophiam.* The making-out of the words one by one is the Interpretation of Nature —

B.

And the ultimate reading of the whole book is the "*Historia Illuminata sive Veritas Rerum;*" the "*Philosophia Secunda;*" the sixth and last part of the Instauration; the consummation which Bacon knew he was not to be permitted himself to see, but trusted that (if men were true to themselves) the Fortune of the Human Race would one day achieve.

A.

And you think that they have not been true to themselves?

B.

Why what have they done with this work since he left it? There it lies to speak for itself, sticking in the middle of the *Novum Organum.* No attempt has been made, that I can hear of, to carry it out further. People seem hardly to know that it is not complete. John Mill observes that Bacon's method of inductive logic is defective, but does not advert to the fact that of *ten* separate processes which it was designed to include, the first only has been explained. The other nine he had in his head, but did not live to set down more of them than the names. And the particular example which he has left of an inductive inquiry does not profess to be carried beyond the first stage of generalization, — the *vindemiatio prima* as he calls it.

A.

It may be so; but *why* have they not attempted to carry his process out further? Is it not because they have found that they can get on faster with their old tools?

B.

Because they *think* they can get on faster; you cannot say they have *found* it until they have tried.

A.

Have they not tried Bacon's way partially, and found it not so handy? Has not Sir John Herschel, for instance, tried the use of his famous classification of Instances, and pronounced it "more apparent than real?" And is it not a fact that no single discovery of importance has been actually made by proceeding according to the method recommended by Bacon? I am sure I have heard as much

reported upon the authority of a very eminent modern writer upon these subjects.

B.

So have I. And I can well believe that the use of Bacon's "Prerogatives of Instances," *in the way they have been used*, is not much; and for the reason given by Herschel, viz., because the same judgment which enables you to assign the Instance its proper *class*, enables you, without that assignation, to recognize its proper value. Therefore so long as the task of gathering his Instances as they grow wild in the woods is left to the Interpreter of Nature himself, there is little use in a formal classification; he knows exactly what he wants; what is not to his purpose he need not trouble himself with; what is to his purpose he can apply to that purpose at once. And each several man of genius will no doubt acquire a knack of his own by which he will arrive at his results faster than by any formal method. But suppose the Interpreter wants to use the help of other people, to whom he cannot impart his own genius or his peculiar gift of knowing at first sight what is to the purpose and what not. He wants them to assist him in gathering materials. How shall he direct them in their task so that their labours may be available for himself? I take it, he must distribute the work among several and make it pass through several processes. One man may be used to make a rough and general collection, — what we call an *omnium gatherum*. Another must be employed to reduce the confused mass into some order fit for reference. A third to clear it of superfluities and rubbish. A fourth must be taught to classify and arrange what remains. And here I cannot but think that Bacon's arrangement of Instances according to what he calls their Prerogatives, or some better arrangement of the same kind which experience ought to suggest, would be found to be of great value; especially when it is proposed to make through all the regions of Nature separate collections of this kind such as may combine into one general collection. For though it be true that as long as each man works only for himself, he may trust to the *usus uni rei deditus* for finding out the method of proceeding which best suits the trick of his own mind, — and each will probably pursue a different method, — yet when many men's labours are to be gathered into one table, any collector of statistics will tell you that they must all work according to a common pattern. And in the subject we are speaking of which is coextensive with the mind of man on one side and the nature of things on the other, that will undoubtedly be the best pattern which is framed upon the justest theory of the human understanding; — for which distinction Bacon's would seem to be no unlikely candidate.

However I am here again getting out of my province. It may be that Bacon's project was visionary; or it may be that it is only *thought* visionary, because since his death no heart has been created large enough to believe it practicable. The philosophers must settle that among themselves. But be the cause what it will, it is clear to me on the one hand that the thing has not been seriously attempted; and on the other, that Bacon was fully satisfied that nothing of worth could be hoped for without it; therefore that we have no right to impute to him either the credit of all that has been done by the new philosophy, or the discredit of all that has been left undone.

A.

Certainly not; if you are right as to the fact. But I still think there must be some mistake. How is it possible that among so many distinguished men as have studied Bacon's philosophy with so much reverence, such a large feature can have been overlooked?

B.

I cannot pretend to explain that. But an appeal to one's own eyes is always lawful. Here is one passage which is enough by itself to settle the question. If you are not satisfied with it, I can quote half a dozen more to the same effect: "*Illud interim quod sæpe diximus etiam hoc loco præcipue repetendum est—*"

A.

Translate; if you would have me follow.

B.

"I must repeat here again what I have so often said;—that though all the wits of all the ages should meet in one,—though the whole human race should make Philosophy their sole business,—though the whole earth were nothing but colleges and academies and schools of learned men,—yet without such a natural and experimental history as I am going to describe, no progress worthy of the human race in Philosophy and the Sciences could possibly be made: whereas if such a history were once provided and well ordered, with the addition of such auxiliary and light-giving experiments as the course of Interpretation would itself suggest, the investigation of Nature and of all sciences would be the work only of a few years. Either this must be done, therefore, or the business must be abandoned. For in this way and in this way only can the foundation be laid of a true and active Philosophy."

A.

Where does he say that?

B.

In the Preface to what he calls the "*Parasceve ad Historiam naturalem et experimentalem,*" which is in fact nothing more than a description of the sort of history which he wanted,—such a history as a true Philosophy might be built upon,—with directions to be

observed in collecting it. He published it (somewhat out of its proper place) in the same volume with the *Novum Organum*, in order that, if possible, men might be set about the work at once; of such primary importance did he hold it to be. If you distrust my translation, take it in his own English. In presenting the *Novum Organum* to the King, after explaining the nature and objects of the work and his reason for publishing it in an imperfect shape, he adds, "There is another reason for my so doing; which is to try whether I can get help in one intended part of this work, namely the compiling of a natural and experimental history, *which must be the main foundation of a true and active philosophy.*" And again about a week after, in reply to the King's gracious acknowledgement of the book, — "This comfortable beginning makes me hope further that your Majesty will be aiding to me in setting men on work for the collecting of a natural and experimental history, which is *basis totius negotii.*" And this was no after-thought, but an essential feature of his design as he had conceived it at least sixteen years before. There is extant a description of this proposed history, which appears to have been written as early as 1604; and though the only copy that I know of is in an imperfect and mutilated manuscript, enough remains to show that in all its material features it agreed exactly with the description set forth in the *Parasceve.*

Now you know I am not going to discuss the merit of his plan. It may (as I said) have been all a delusion. But grant it a delusion — still it was a delusion under which he was actually labouring. If every man of science that ever lived had considered it and pronounced it puerile and ridiculous, still their unanimous verdict could not, in the face of his own repeated and earnest declarations, persuade me that it was not an essential part of Bacon's scheme; that it was not (in his perfect and rooted judgment) the one key to the cipher in which the fortunes of the human race are locked up, — the one thing *with* which all might be done; *without* which nothing. And this is all that is necessary for our present business. For we are not discussing his philosophical capacity, but his personal character and purposes as illustrated by the tenour of his life.

Such in 1847 were my reasons for rejecting as unsatisfactory all the explanations I had then met with of the distinctive peculiarity of the Baconian philosophy, and such the result of my attempt to find a more satisfactory one for myself.

In rejecting former explanations as unsatisfactory, Mr. Ellis, it will be seen, concurs with me, and for much the same reason. According to them "it becomes," he says, "impossible to

justify or to understand Bacon's assertion that his system was essentially new." He then proceeds to point out one great peculiarity by which it aspired to differ from all former systems — a peculiarity residing in the supposed perfection of the logical machinery; which, since it would of itself account for Bacon's belief of its importance no less than for his assertion of its novelty, does certainly supply a new explanation unencumbered with the difficulties pointed out in the foregoing extract. But there is another difficulty which it leaves behind. It is impossible, I think, to reconcile with this supposition the course which Bacon afterwards took in expounding and developing his system. For if the great secret which he had, or thought he had, in his keeping, lay only, or even chiefly, in the perfection of the logical machinery — in the *method* of induction; if this method was a kind of mechanical process — an *organum* or engine — at once "wholly new," "universally applicable," "in all cases infallible," and such as anybody might manage; if his explanation of this method in the second book of the *Novum Organum* is so incomplete that it leaves all the principal practical difficulties unexplained; and if it was a thing which nobody but himself had any notion of, or any belief in; how is it that, during the remaining five years of his life — years of eager and unremitting labour, devoted almost exclusively to the exposition of his philosophy — he made no attempt to complete the explanation of it? Why did he leave the *Novum Organum* as it was, being a work which he could have completed alone, and which indeed he only could have completed, and apply himself with advised and deliberate industry to the collection of Natural History; a work which he knew he could not carry to perfection himself, even in any of its parts; which he had once thought it a waste of time to employ himself upon, as being within every man's capacity; concerning the execution of which he had already given sufficient general directions; and of which, even when accomplished, the right use could not be made except in virtue of that very *method* or logical machinery, the constitution and management of which still remained to be explained? It was not that he had changed his opinion as to the value of it: His sense of the difficulties may have increased, his views as to details may have altered; but there is no reason to think that he ever lost any part of his faith either in the importance

or in the practicability of it. It was not that when he came to closer quarters with the subject, he felt that he was himself unable to deal with it: Two years after the publication of the first part of the *Novum Organum*, and three years before his death, he speaks of the second part as a thing yet to be done, but adds, "quam tamen animo jam complexus et metitus sum."[1] It was not that he thought the description he had already given sufficient: In the winter of 1622, he tells us that there are "haud pauca, *eaque ex præcipuis*," still wanting. It was not that he had found any disciple or fellow-labourer to whom he might intrust the completion of his unfinished task: To the very last he felt himself alone in his work. It was not from inadvertence: He left the *Novum Organum* for the *Natural History* deliberately, because it seemed upon consideration the better and more advisable course; "quare omnino et ante omnia in hoc incumbere *satius et consultius* visum est." It was not that he wanted either time or industry; for during the five succeeding years he completed the *De Augmentis*, and composed his histories of the *Winds*, of *Life and Death*, of *Dense and Rare;* his lost treatise on *Heavy and Light*, his lost *Abecedarium Naturæ*, his *New Atlantis*, his *Sylva Sylvarum*. Why did he employ no part of that time in completing the description of the new machine? in explaining how he proposed to supply the defects[2] and rectify the errors[3] of the imperfect logical process which he had already exhibited; how to adapt the mode of inquiry to the nature of the subject[4]; how to determine what questions ought to be dealt with first, — what "natures" to have precedence in the order of inquiry[5]; above all, how to ascertain where the inquiry might safely terminate as having left no "nature" in the universe unchallenged[6], — a security without which the whole process must always have been in danger of vitiation from an "instance contradictory" remaining behind? To me the question appears to admit of but one answer. He considered the collection of natural history upon the plan he meditated, to be, in practice at least, a more important part of his philosophy than the *Organum* itself, — a work of which

[1] Letter to Fulgenzio.
[2] De Adminiculis Inductionis.
[3] De Rectificatione Inductionis.
[4] De Variatione Inquisitionis pro naturâ subjecti.
[5] De Prærogativis Naturarum quatenus ad inquisitionem, sive de eo quod inquirendum est prius et posterius.
[6] De Terminis Inquisitionis, sive de Synopsi omnium naturarum in universo.

the nature and importance more needed to be pressed upon the attention of mankind, — of which the neglect would be more fatal to the progress of science. That this was in fact his opinion at the very time he was composing the *Novum Organum* may be inferred from the last aphorism of the first book, as I have pointed out at the end of the preface. That he was still of the same opinion two years after, we have his own express declaration in the *Auctoris monitum* prefixed to the *History of the Winds*, where he explains his motives for going on with the third part of the Instauratio, instead of finishing the second. It had occurred to him, he there tells us, that if the *Organum* should fall into the hands of some man of genius capable of understanding and willing to use it, still without a natural history of the proper kind provided to his hand, he would not know how to proceed; whereas if a full and faithful history of nature and the arts were set before him, he might succeed *even by the old method* — "licet via veteri pergere malint, nec via nostri organi (quæ ut nobis videtur aut unica est aut optima) uti" — in building upon it something of solid worth. "Itaque huc res redit," he concludes; "ut *organum nostrum*, etiamsi fuerit absolutum, *absque historiâ naturali non multum*, *historia naturalis absque organo non parum*, instaurationem scientiarum sit provectura." I know not how therefore to escape the conclusion that, in Bacon's own estimate of his own system, the Natural History held the place of *first* importance. He regarded it as not less new [1] than the new *method*, and as more indispensable. Though the "*via nostri organi*" still appeared to him to be "*aut unica aut optima*," something of substantial worth might, he thought, be accomplished without it. Without a natural history "tali qualem nunc præcipiemus," he thought no advance of any value could possibly be made.

What may be the *real* value of this part of Bacon's system is, of course, quite another question. The evidence just adduced goes only to show what was the value which he himself set upon it, and affects the question no otherwise than by giving it a new interest, and suggesting the expediency of considering

[1] His assertion of the *novelty* is as strong in the one case as in the other. *Atque hoc posterius* [viz. the use of natural history, "tanquam materia prima philosophiæ atque veræ inductionis supellex sive sylva"] *nunc agitur; nunc inquam*, NEQUE UNQUAM ANTEHAC."

more carefully than has yet, I think, been done, whether his advice on this head might not be followed—I do not say as far as he intended — but much further than has yet been tried; with effects—I do not say such as he anticipated—but larger than we are likely to get any other way.

That he himself indeed, even if all mankind had united to carry his plan into effect, would have been disappointed with the result, I have little doubt. For I suppose the collected observations of all the world, — reduced to writing, digested, and brought into his study, — would not have sufficed to give him that knowledge of the *forms* of nature which was to carry with it the command over her powers. He would have found no doubt, upon trial, that his scheme involved difficulties of which he had formed no conception. He would have found that the facts which must be known in order to complete the three tables of comparence, and to "perfect the *exclusiva*," were so infinite in number that to gather them by simple observation without some theoretic principle of selection would be an endless task, and to deal with them when gathered a hopeless one. He might still indeed have hoped to arrive ultimately at an *alphabet* of nature (her principles being probably few and simple, though her phenomena so enormously complex); but he would have found that a *dictionary* or *index* of nature (and such was to be the office of the *Natural History*), to be complete enough for the purposes of the *Novum Organum*, must be nearly as voluminous as Nature herself. He would have found it necessary, therefore (as I suppose all inventors have done both before and since his time), to make material changes in his original plan of operation, and to reduce his hopes far below their original dimensions. But a man may be in the right way to his end, though the end itself be further off than he imagines; and before we cast Bacon's plan finally aside, we may be fairly called upon to show either that the way he wanted us to go is in its nature impracticable, or that there is better hope of arriving at the desired end by some other.

Mr. Ellis's judgment upon the first point may be partly gathered from his general remarks upon the third part of the Instauratio; but I am fortunately in possession of his opinion (called forth by the exposition of my own views in the dialogue above quoted) upon the specific practical question now under discussion. It was communicated to me in a letter dated 13th

September, 1847, and appears to contain his deliberate judgment as to the *practicability* of making a collection of natural history, such as would be available for scientific purposes, in the manner in which Bacon proposed to have it made.

"That it is impossible (he says) to sever the business of experiment and observation from that of theorising, it would perhaps be rash to affirm. But it seems to me that such a severance could hardly be effected. A transcript of nature, if I may so express myself, — that is, such a collection of observed phenomena as would serve as the basis and materials of a system of natural philosophy, — would be like nature itself infinite in extent and variety. No such collection could be formed; and, were it formed, general laws and principles would be as much hidden in a mass of details as they are in the world of phenomena.

"The marshalling idea, teaching the philosopher what observations he is to make, what experiments to try, seems necessary in order to deliver him from this difficulty. Can we conceive that such experiments as those of Faraday could have preceded the formation of any hypothesis? You allude, I think, to what has been done in the way of systematic observation with reference to terrestrial magnetism. And beyond all doubt the division of labour is possible and necessary in many scientific inquiries. But then this separating of the observer from the theoriser is only possible (at least, in such a case as that of magnetism) when the latter can tell his "bajulus" what experiments he is to make, and how they are to be made. As a matter of fact, the memoirs of Gauss, which have done so much to encourage systematic observation of terrestrial magnetism, contain many results of theory directly bearing on observation; *e. g.*, the method of determining the absolute measure of magnetism.

* * * * *

"Of course I remember that Bacon speaks of experiments to be suggested by theory: as for instance in Solomon's house; all I mean is, that it seems doubtful whether a large collection of facts can in most sciences be made useful, unless some theory has guided its formation."

Now I am quite willing to accept this judgment as perfectly sound and just; as pointing truly at the practical difficulties involved in Bacon's scheme, and proving that it could not be carried out *completely* on the plan he proposed, or attain *com-*

pletely the end at which he aimed; and certainly, if I thought that such completeness was a condition absolutely essential,—that, unless observation could be carried on without any help whatever from theory, the work could not proceed at all; or that the results of observation so conducted could be of no scientific value unless they amounted to a perfect "transcript of nature;"—if I thought, in short, it was a scheme which, unless it led to everything, would lead to nothing,—I should accept these remarks as disposing finally of the whole question. But why should I think so? That the severance of theory and observation should be *absolute* does not appear to me to be at all necessary for the practical prosecution of the enterprise; I can hardly think that it even formed part of the original design; and though it is true that the collection of natural history could not have been used *in the way Bacon proposed,* unless it were more complete than it ever could have been made, yet for use in the ordinary way (and this was certainly *one* of the uses he contemplated for it) its value would be increased by every new observation; and who can say at what point observations so conducted must necessarily stop?

That Bacon intended one set of men to be employed in collecting facts, and another in deriving consequences from them, is no doubt true. Unless theory and observation could be so far separated as to admit practically of such a distribution of parts, his plan must no doubt have been given up; and it is objected that this distribution is practically impossible, because the observers, unless they had some precedent theory to guide them, could never know what observations to make in order to bring out the facts which the theorist requires to know. I cannot but think, however, that this objection supposes a separation of the two functions far more complete than Bacon ever contemplated. He may have used words which in strict logical construction imply such a kind of separation; but if so, his words meant more than he himself meant. His intellect was remarkable for breadth rather than subtlety,—quicker, to use his own division, in perceiving resemblances than distinctions,—and in writing he always aimed at conciseness, force, point, picturesqueness, and at making himself plain to common understandings, far more than at metaphysical exactness of expression. Now, however true it may be, as a metaphysical proposition, that some amount of theory is involved in every

observation, and still more in every series of observations, it is no less true, as a familiar fact, that observations made by one man, without conscious reference to any theory whatever, may be perfectly available to another with reference to theories of which the first never heard or dreamed. Colonel Reid's theory of storms, for instance, was worked out, I am told, not in the West Indies among the hurricanes, but at the Admiralty among the ships' logs. And though Bacon would never have denied that many results of theory go to the correct keeping of a ship's log, who can doubt that a collection of logs kept during hurricanes would have been accepted by him as a most valuable contribution to a history of the winds, and a good specimen of the very thing he wanted? It would be easy to add more instances; but I suppose nobody will deny that, *in this sense*, observation and theory *can* be carried on apart and by different persons. And if it be objected that the observers will never hit upon all the facts which are necessary to suggest or establish the theory, unless their observations be renewed again and again under directions devised by the theorist with special reference to what he wants to know, I reply by asking what is to prevent the renewal of them, under directions so devised, as often as necessary? a thing (I may observe) which Bacon himself distinctly intended. "Illud interim," he says, after giving an example of a "topica particularis" in the *De Augmentis*, "quod monere occœpimus iterum monemus, nempe ut homines debeant topicas particulares suas alternare, ita ut post majores progressus aliquos in inquisitione factos, *aliam et subinde aliam instituant topicam*, si modo scientiarum fastigia conscendere cupiant." Now if the directions, judicious to begin with, be judiciously varied and repeated as the inquiry proceeds, an immense mass of observations of the greatest importance to science might surely be collected in this very way. Nay, in subjects which have their phenomena spread far and wide over the world (like winds, seasons, and oceanic or atmospheric currents), it is in the gradual accumulation of observations so made that our only hope lies of ever coming to understand their laws at all; and if we cannot cause them to be collected under direction and design, we must wait till they accumulate by accident. For it is manifestly impossible that in such subjects as these, philosophers should provide themselves with all the facts which they want unless they can use the help of those who

are not philosophers. What science deals with phenomena more subtle and delicate than meteorology? Yet hear Sir John Herschel. "It happens fortunately that almost every *datum* which the scientific meteorologist can require is furnished in its best and most available state by that definite systematic process known as the "*keeping a meteorological register*," which consists in noting at stated hours of every day the readings of all the meteorological instruments at command, as well as all such facts or indications of wind and weather as are susceptible of being definitely described and estimated without instrumental aid. Occasional observations apply to occasional and remarkable phenomena, and are by no means to be neglected; *but it is to the regular meteorological register, steadily and perseveringly kept throughout the whole of every voyage, that we must look for the development of the great laws of this science.*[1]

Between the officers of Her Majesty's navy registering the readings of their instruments in all latitudes and longitudes, and the man of science in his study deducing the laws of meteorology from a comparison of the results, the division of labour is surely as complete as Bacon would have desired. Nor would the scientific directions previously furnished to the officers for their guidance, directions when, where, what, and how to observe and record,—though containing "many results of theory bearing upon observation,"—have seemed to him either objectionable or superfluous: on the contrary, such directions form part of his own design as explained by himself. In the concluding paragraph of the tract which has suggested these remarks he distinctly announces his intention to draw up certain heads of inquiry showing what points with reference to each subject were more particularly to be observed. And though he did not live to execute this part of his design, a few fragments remaining among his papers show in what manner he proposed to proceed. And (if an idle looker-on who can offer no help in the work may presume to offer an opinion) I could wish that men of science would apply themselves earnestly to the solution of this practical problem: What measures are to be taken in order that the greatest variety of judicious observations of nature all over the world may be carried on

[1] Manual of Scientific Inquiry, prepared for the use of officers in Her Majesty's navy and travellers in general. Edited by Sir John F. W. Herschel, Bt., p. 281.

in concert upon a scientific plan, and brought to a common centre? With reference to some particular subjects, such measures have been of late years taken on a scale of Baconian magnitude. The system of observations instituted by the Great British Association with respect to Terrestrial Magnetism, if I am rightly informed as to the nature and scale of it, is one which Bacon would have welcomed as he welcomed the first tidings from Galileo's telescope; he would have accepted it as an enterprise "dignum humano genere." A similar system of concerted observations is now in contemplation with regard to oceanic currents. As a specimen of the same thing in a more general character, take the "Admiralty Manual of Scientific Inquiry," to which I have already referred; a book of practical directions drawn up by some of the most eminent scientific men of our day with special reference to the progress of science in several of its most important departments; directions addressed not to men who are themselves engaged in the theoretical investigation of the subjects, or guided by any "marshalling idea," but to "officers of the navy and travellers in general," telling them what things to observe, in order that their observations may be available for the purposes of scientific inquiry. These are exactly what Bacon would have called "Topicæ Inquisitionis," —instructions for the examination of Nature "super articulos;" and the whole scheme is in perfect accordance, so far as it goes, with Bacon's notion of the way in which men might be set on work for the completing of a natural and experimental history. Why should it not go further? Who can believe that the subjects contained in this little volume are the only subjects to which this method of collecting observations can be applied? who venture to fix the limit beyond which, under such a system sagaciously devised, wisely administered, energetically carried out, and extended to all the departments of nature which admit of it, human discovery may not go?—*J. S.*

PARASCEVE

AD

HISTORIAM NATURALEM ET EXPERIMENTALEM.

DESCRIPTIO

HISTORIÆ NATURALIS ET EXPERIMENTALIS,

QUALIS SUFFICIAT ET SIT IN ORDINE AD BASIN ET FUNDAMENTA PHILOSOPHIÆ VERÆ.

Quod Instaurationem nostram per partes edamus, id eo spectat ut aliquid extra periculum ponatur. Non absimilis nos movet ratio ut aliam quandam operis particulam jam in præsenti subjungamus, et cum iis quæ supra absolvimus una edamus. Ea est descriptio et delineatio Historiæ Naturalis et Experimentalis, ejus generis quæ sit in ordine ad condendam philosophiam, et complectatur materiem probam, copiosam, et apte digestam ad opus interpretis quod succedit. Huic autem rei locus proprius foret quum ad *Parascevas* Inquisitionis ordine deventum fuerit. Hoc vero prævertere, nec locum proprium expectare, consultius nobis videtur; quod hujusmodi historia, qualem animo metimur et mox describemus, res perquam magnæ sit molis, nec sine magnis laboribus et sumptibus confici possit; ut quæ multorum opera indigeat, et (ut alibi diximus) opus sit quasi regium. Itaque occurrit illud, non abs re fore experiri si forte hæc aliquibus aliis curæ esse possint, ita ut dum nos destinata ordine perficiamus hæc pars quæ tam multiplex est et onerosa etiam vivis nobis (si ita divinæ placuerit majestati) instrui et parari possit, aliis una nobiscum in id sedulo incumbentibus; præsertim quum vires nostræ (si in hoc soli fuerimus) vix tantæ provinciæ sufficere videantur. Etenim quæ ad opus ipsum intellectus pertinent nos marte nostro fortasse vincemus. At intellectus materialia tam late patent ut ea (tanquam per procuratores et mercatores) undique conquiri et importari debeant. Accedit etiam illud, quod cœptis nostris vix dignum esse æstimemus ut in re tali quæ fere omnium industriæ pateat nos ipsi tempus

teramus. Quod autem caput rei est ipsi nunc præstabimus; ut ejusmodi historiæ modum et descriptionem, qualis intentioni nostræ satisfaciat, diligenter et exacte proponamus; ne homines non admoniti aliud agant, et ad exemplum naturalium historiarum quæ jam in usu sunt se regant, atque ab instituto nostro multum aberrent. Illud interim quod sæpe diximus etiam hoc loco præcipue repetendum est; non si omnia omnium ætatum ingenia coivissent aut posthac coierint; non si universum genus humanum philosophiæ dedisset operam aut dederit, et totus terrarum orbis nihil aliud fuisset aut fuerit quam academiæ et collegia et scholæ virorum doctorum; tamen absque tali qualem nunc præcipiemus Historia Naturali et Experimentali, ullos qui genere humano digni sint progressus in philosophia et scientiis fieri potuisse aut posse. Contra vero, comparata et bene instructa hujusmodi historia, additis experimentis auxiliaribus et luciferis quæ in ipso interpretationis curriculo occurrent aut eruenda erunt, paucorum annorum opus futuram esse inquisitionem naturæ et scientiarum omnium. Itaque aut hoc agendum est aut negotium deserendum. Hoc enim solo et unico modo fundamenta philosophiæ veræ et activæ stabiliri possunt; et simul perspicient homines, tanquam ex profundo somno excitati, quid inter ingenii placita et commenta ac veram et activam philosophiam intersit, et quid demum sit de natura naturam ipsam consulere.

Primo igitur de hujusmodi historia conficienda præcepta dabimus in genere; deinde particularem ejus figuram hominibus sub oculos ponemus, inserentes interdum non minus *ad quid* inquisitio aptanda et referenda sit quam *quid* quæri debeat; scilicet, ut scopus rei bene intellectus et prævisus etiam alia hominibus in mentem redigat quæ a nobis fortasse prætermissa erunt. Historiam autem istam *Historiam Primam* sive *Historiam Matrem* appellare consuevimus.

APHORISMI
DE CONFICIENDA HISTORIA PRIMA.

Aphorismus
I.

Natura in triplici statu ponitur et tanquam regimen subit trinum. Aut enim libera est et cursu suo ordinario se explicat, aut a pravitatibus et insolentiis materiæ atque ab impedimentorum violentia de statu suo detruditur, aut ab arte et ministerio humano constringitur et fingitur. Atque primus ille status ad *species* rerum refertur, secundus ad *monstra*, tertius ad *artificialia*. Etenim in artificialibus natura jugum recipit ab imperio hominis; nunquam enim illa facta fuissent absque homine. At per operam et ministerium hominis conspicitur prorsus nova corporum facies et veluti rerum universitas altera sive theatrum alterum. Triplex itaque est historia naturalis. Tractat enim aut naturæ *Libertatem* aut *Errores* aut *Vincula*; ut non male eam partiri possimus in historiam *Generationum*, *Prætergenerationum*, et *Artium*; quarum postremam etiam *Mechanicam* et *Experimentalem* appellare consuevimus. Neque tamen id præcipimus ut hæc tria separatim tractentur. Quidni enim possint historiæ monstrorum in singulis speciebus cum historia ipsarum specierum conjungi? Etiam artificialia quandoque cum speciebus recte conjunguntur, quandoque melius separantur. Quamobrem e re nata de his consilium capere optimum est. Methodus enim iterationes et prolixitatem gignit, æque ubi nimia est ac ubi nulla.

II.

Historia naturalis, ut subjecto (quemadmodum diximus) triplex, ita usu duplex est. Adhibetur enim aut propter rerum ipsarum cognitionem quæ historiæ mandantur, aut tanquam materia prima philosophiæ atque veræ inductionis supellex sive sylva. Atque posterius hoc nunc agitur; nunc, inquam, neque unquam antehac. Neque enim Aristoteles aut Theophrastus

aut Dioscorides aut Caïus Plinius, multo minus moderni, hunc finem (de quo loquimur) historiæ naturalis unquam sibi proposuerunt. Atque in hoc plurimum est, ut qui partes scribendi historiam naturalem sibi posthac sumpserint hoc perpetuo cogitent atque animo agitent, se non lectoris delectationi, non utilitati ipsi quæ ex narrationibus in præsens capi possit, debere inservire; sed conquirere et comparare rerum copiam et varietatem quæ veris axiomatibus conficiendis sufficiat. Hoc enim si cogitent, modum hujusmodi historiæ ipsi sibi præscribent. Finis enim regit modum.

III.

Quo autem majoris est hæc res operæ et laboris, eo illam minus onerari superfluis consentaneum est. Tria itaque sunt de quibus homines sunt plane admonendi ut in illis parce admodum operam suam collocent, tanquam iis quæ massam operis in immensum augeant, virtutem parum aut nihil promoveant.

Primo igitur facessant antiquitates et citationes aut suffragia authorum; etiam lites et controversiæ et opiniones discrepantes; omnia denique philologica. Neque enim citetur author nisi in re dubiæ fidei, neque interponatur controversia nisi in re magni momenti. Quæ vero ad ornamenta orationis et similitudines et eloquentiæ thesaurum et hujusmodi inania spectant, omnino abjiciantur. Etiam quæ recipiuntur omnia et ipsa proponantur breviter et strictim, ut nihil minus sint quam verba. Nemo enim qui materialia ad ædificia vel naves vel hujusmodi aliquas structuras colligit et reponit, ea (officinarum more) belle collocat et ostentat ut placeant, sed in hoc tantum sedulus est ut proba et bona sint, et ut in repositorio spatium minimum occupent. Atque ita prorsus faciendum est.

Secundo, non multum ad rem facit luxuria illa historiarum naturalium in descriptionibus et picturis specierum numerosis, atque earundem varietate curiosa. Hujusmodi enim pusillæ varietates nihil aliud sunt quam lusus quidam naturæ et lascivia, et prope ad individuorum naturam accedunt; atque habent peragrationem quandam in rebus ipsis amœnam et jucundam, informationem vero ad scientias tenuem et fere supervacuam.

Tertio, missæ plane faciendæ sunt omnes narrationes superstitiosæ (non dico prodigiosæ, ubi memoria earum reperietur fida et probabilis, sed superstitiosæ), et experimenta magiæ ceremonialis. Nolumus enim philosophiæ infantiam, cui historia naturalis primam præbet mammam, fabulis anilibus assuescere.

Erit fortasse tempus (postquam in inquisitionem naturæ paulo altius penetratum sit) hujusmodi res leviter percurrendi, ut si quid in illis fæcibus hæreat virtutis naturalis ea extrahi et in usum condi possit. Interim seponendæ sunt. Etiam magiæ naturalis experimenta diligenter et cum severitate ventilanda sunt antequam recipiantur, præsertim illa quæ ex vulgaribus sympathiis et antipathiis, magna cum socordia et facilitate credendi simul et fingendi, derivari solent.

Neque nil aut parum actum est in exoneranda historia naturali tribus his (quæ diximus) rebus superfluis, quæ alias volumina impleturæ fuissent. Neque tamen hic finis. Æque enim requiritur in opere magno ut tam ea quæ recipiuntur succincte scribantur, quam ut superflua abscindantur; licet nemini dubium esse possit quin hujusmodi castitas et brevitas delectationem multo minorem tum legenti tum scribenti præbitura sit. Verum illud semper inculcandum est, hoc quod paratur horreum esse tantummodo et promptuarium rerum; in quo non manendum aut habitandum sit cum voluptate, sed eo descendendum, prout res postulat, cum aliquid ad usum sumendum sit circa opus *Interpretis* quod succedit.

IV.

In historia quam requirimus et animo destinamus, ante omnia videndum est ut late pateat et facta sit ad mensuram universi. Neque enim arctandus est mundus ad angustias intellectus (quod adhuc factum est), sed expandendus intellectus et laxandus ad mundi imaginem recipiendam, qualis invenitur. Istud enim, *respicere pauca et pronunciare secundum pauca*, omnia perdidit. Resumentes igitur partititionem quam paulo ante fecimus historiæ naturalis (quod sit Generationum, Prætergenerationum, et Artium), Historiæ Generationum constituimus partes quinque. Sit prima, ætheris et cœlestium. Secunda, meteororum et regionum (quas vocant) aëris; tractuum videlicet a luna usque ad superficiem terræ; cui etiam parti cometas cujuscunque generis, tum sublimiores tum humiliores, utcunque se habeat rei veritas, ordinis causa assignamus. Tertia, terræ et maris. Quarta, elementorum (quæ vocant) flammæ sive ignis, aëris, aquæ, et terræ. Elementa autem eo sensu accipi volumus, ut intelligantur non pro primordiis rerum sed pro corporum naturalium massis majoribus. Ita enim natura rerum distribuitur, ut sit quorundam corporum quantitas sive massa in universo perquam magna, quia scilicet ad schematismum eorum

requiritur textura materiæ facilis et obvia; qualia sunt ea quatuor (quæ diximus) corpora; at quorundam aliorum corporum sit quantitas in universo parva et parce suppeditata, propter texturam materiæ valde dissimilarem et subtilem et in plurimis determinatam et organicam; qualia sunt species rerum naturalium, metalla, plantæ, animalia. Quare prius genus corporum *Collegia Majora*, posterius *Collegia Minora* appellare consuevimus. At Collegiorum istorum Majorum est pars historiæ quarta, sub nomine elementorum, ut diximus. Neque vero confunditur pars quarta cum secunda aut tertia in hoc, quod in singulis mentionem aëris, aquæ, terræ fecimus. In secunda enim et tertia recipitur historia eorum, tanquam mundi partium integralium, et quatenus pertinent ad fabricam et configurationem universi; at in quarta continetur historia substantiæ et naturæ ipsorum, quæ in singulis eorum partibus similaribus viget, nec ad totum refertur. Quinta denique pars historiæ Collegia Minora sive Species continet; circa quas historia naturalis hactenus præcipue occupata est.

Historiam vero Prætergenerationum quod attinet, jamdudum a nobis dictum est quod illa cum historia generationum commodissime conjungi possit; ea scilicet quæ sit prodigiosa tantum et naturalis. Nam superstitiosam miraculorum historiam (cujuscunque sit generis) omnino relegamus in tractatum proprium; neque ipsum jam inde a principio suscipiendum, sed paulo post, quando altius in naturæ inquisitionem penetratum fuerit.

At Historiam Artium et naturæ ab homine versæ et immutatæ, sive Historiam Experimentalem, triplicem constituimus. Aut enim deprompta est ex artibus mechanicis; aut ex operativa parte scientiarum liberalium; aut ex practicis compluribus et experimentis quæ in artem propriam non coaluerunt, immo quæ quandoque ex vulgatissima experientia occurrunt nec artem omnino desiderant. Quamobrem si ex his omnibus quæ diximus, Generationibus, Prætergenerationibus, Artibus et Experimentis, confecta fuerit historia, nihil prætermissum videtur per quod sensus ad informandum intellectum instrui possit. Neque igitur amplius intra circulos parvos (veluti incantati) subsultabimus, sed mundi pomœria circuitione æquabimus.

V.

Inter partes eas quas diximus historiæ, maximi usus est historia artium; propterea quod ostendat res in motu, et magis

recta ducat ad praxin. Quinetiam tollit larvam et velum a rebus naturalibus, quæ plerunque sub varietate figurarum et apparentiæ externæ occultantur aut obscurantur. Denique vexationes artis sunt certe tanquam vincula et manicæ Protei, quæ ultimos materiæ nixus et conatus produnt. Corpora enim perdi aut annihilari nolunt; sed potius in varias formas se mutant. Itaque circa hanc historiam, licet mechanicam (ut videri possit) et minus liberalem, (missa arrogantia et fastu) summa est adhibenda diligentia.

Rursus, inter artes præferuntur eæ quæ corpora naturalia et rerum materialia exhibent, alterant, et præparant; ut agricultura; coquinaria; chymica; tinctoria; opificia vitri, esmaltæ, sacchari, pulveris pyrii, ignium artificialium, papyri, et hujusmodi. Jejunioris autem sunt usus quæ præcipue consistunt in motu subtili manuum et instrumentorum; quales sunt textoria; fabrilis; architectura; opificia molendinorum, horologiorum, cum similibus; licet et istæ nullo modo negligendæ sint; tum quia in illis occurrunt multa quæ ad corporum naturalium alterationes spectant, tum quia accurate informant de motu lationis, quæ res est magni prorsus ad plurima momenti.

Verum in congerie universa istius Artium Historiæ, illud omnino monendum est et penitus memoriæ mandandum; recipienda esse experimenta artium non solum ea quæ ducunt ad finem artis, sed etiam quæ ullo modo interveniunt. Exempli gratia, quod locustæ aut cancri cocti, cum prius colorem luti referrent, rubescant, nihil ad mensam; sed hæc ipsa instantia tamen non mala est ad inquirendam naturam rubedinis, cum idem eveniat etiam in lateribus coctis. Similiter, quod carnes minori mora saliantur hyeme quam æstate, non eo tantum spectat ut coquus cibos bene et quantum sufficit condiat; sed etiam instantia bona est ad indicandam naturam et impressionem frigoris. Quamobrem toto (quod aiunt) cœlo erraverit, qui intentioni nostræ satisfieri existimaverit si artium experimenta colligantur, hujus rei solum gratia ut hoc modo artes singulæ melius perficiantur. Licet enim et hoc non prorsus contemnamus in multis, tamen ea plane est mens nostra ut omnium experimentorum mechanicorum rivuli in philosophiæ pelagus undequaque fluant. Delectus autem instantiarum in unoquoque genere eminentiorum (quas maxime et diligentissime conquirere oportet et quasi venari) ex prærogativis instantiarum petendus est.

VI.

Resumendum etiam est hoc loco quod in aphorismis 99, 119, 120, libri primi fusius tractavimus, hic vero præcepti more breviter imperare sufficiat; hoc est, ut recipiantur in hanc historiam, primo res vulgatissimæ, quales quis supervacuum putaret scripto inserere, quia tam familiariter notæ sunt; dein res viles, illiberales, turpes (*omnia enim munda mundis*, et si lucrum ex lotio boni odoris sit multo magis lumen et informatio ex re qualibet); etiam res leves et pueriles (nec mirum, repuerascendum enim plane est); postremo, res quæ nimiæ cujusdam subtilitatis esse videntur, quod in se nullius sint usus. Neque enim (ut jam dictum est) quæ in hac historia proponentur propter se congesta sunt; itaque neque dignitatem eorum ex se metiri par est, sed quatenus ad alia transferri possint, et influant in philosophiam.

VII.

Illud insuper præcipimus, ut omnia in naturalibus tam corporibus quam virtutibus (quantum fieri potest) numerata, appensa, dimensa, determinata proponantur. Opera enim meditamur, non speculationes. Physica autem et mathematica bene commistæ generant practicam. Quamobrem exactæ restitutiones et distantiæ planetarum, in historia cælestium; terræ ambitus et quantum occupet in superficie respectu aquarum, in historia terræ et maris; quantam compressionem aër patiatur absque forti antitypia, in historia aëris; quantum in metallis alterum alteri præponderet, in historia metallorum; et innumera id genus perquirenda et perscribenda sunt. Cum vero exactæ proportiones haberi non possint, tum certe ad æstimativas aut comparativas indefinitas confugiendum est. Veluti (si forte calculis astronomorum de distantiis diffidimus) quod luna sit infra umbram terræ; quod Mercurius sit supra lunam; et hujusmodi. Etiam cum mediæ proportiones haberi non possint, proponantur extremæ: veluti, quod languidior magnes attollat ferrum ad tale pondus, respectu ponderis ipsius lapidis; et quod maxime virtuosus etiam ad rationem sexagecuplam; quod nos in armato magnete admodum parvo fieri vidimus. Atque satis scimus istas instantias determinatas non facile aut sæpe occurrere, sed in ipso interpretationis curriculo, tanquam auxiliares, (quando res maxime postulat) debere exquiri. Veruntamen si forte occurrant, modo non progressum conficiendæ

naturalis historiæ nimis remorentur, etiam in ipsam eas inserere oportet.

VIII.

Fidem vero eorum quæ in historia sunt recipienda quod attinet; necesse est ut illa sint aut fidei certæ, aut fidei dubiæ, aut fidei damnatæ. Atque prius genus simpliciter est proponendum. Secundum cum nota; viz. per verbum *traditur*, aut *referunt*, aut *audivi ex fide-digno*, et hujusmodi. Nam argumenta fidei in alterutram partem nimis operosum foret adscribere, et proculdubio scribentem nimis remorabitur. Neque multum etiam refert ad id quod agitur; quoniam (ut in aphorismo 118. lib. 1. diximus) falsitatem experimentorum, nisi ea ubique scateant, veritas axiomatum paulo post convincet. Attamen si instantia fuerit nobilior, aut usu ipso aut quia alia multa ex illa pendere possint, tum certe nominandus est author; neque id nude tantum, sed cum mentione aliqua, utrum ille ex relatione aut exscriptione (qualia sunt fere quæ scribit C. Plinius) aut potius ex scientia propria illa affirmaverit; atque etiam utrum fuerit res sui temporis an vetustior; insuper, utrum sit tale quippiam cujus necesse foret ut multi essent testes si verum foret; denique, utrum author ille fuerit vaniloquus et levis an sobrius et severus; et similia, quæ faciunt ad pondus fidei. Postremo res damnatæ fidei et tamen jactatas et celebratas, quales, partim neglectu partim propter usum similitudinum, per multa jam sæcula invaluerunt, (veluti quod adamas liget magnetem, allium enervet, electrum omnia trahat præter ocymum, et alia multa hujusmodi,) oportebit non silentio rejicere, sed verbis expressis proscribere, ne illa amplius scientiis molesta sint.

Præterea non abs re fuerit, si forte origo vanitatis aut credulitatis alicujus occurrat, illam notare; veluti quod herbæ satyrio attributa sit vis ad excitandam venerem, quia radix scilicet in figuram testiculorum efformata sit; cum revera hoc fiat quia adnascitur annis singulis nova radix bulbosa, adhærente radice anni prioris; unde didymi illi. Manifestum autem hoc est, quod nova radix semper inveniatur solida et succulenta, vetus emarcida et spongiosa. Quare nil mirum si altera mergatur in aqua, altera natet; quod tamen pro re mira habetur, et reliquis ejus herbæ virtutibus authoritatem addidit.

IX.

Supersunt additamenta quædam historiæ naturalis utilia,

quæque eam magis commode inflectere et aptare possint ad opus Interpretis quod succedit. Illa quinque sunt.

Primum, quæstiones (non causarum dico sed facti) adjiciendæ sunt, ut inquisitionem ulteriorem provocent et sollicitent; ut in historia terræ et maris, utrum Mare Caspium fluat et refluat, et quali horarum spatio; utrum sit aliqua continens Australis, an potius insulæ; et similia.

Secundo, in experimento aliquo novo et subtiliore addendus est modus ipse experimenti qui adhibitus est; ut liberum sit hominum judicium, utrum informatio per experimentum illud sit fidum aut fallax, atque etiam excitetur hominum industria ad exquirendos modos (si fieri possit) magis accuratos.

Tertio, si quid subsit in aliqua narratione dubii vel scrupuli, id supprimi aut reticeri omnino nolumus; sed plane et perspicue ascribi, notæ aut moniti loco. Cupimus enim historiam primam, veluti facto sacramento de veritate ejus in singulis, religiosissime conscribi; cum sit volumen operum Dei, et (quantum inter majestatem divinorum et humilitatem terrenorum collationem facere liceat) tanquam scriptura altera.

Quarto, non abs re fuerit observationes quandoque aspergere (id quod C. Plinius fecit); veluti in historia terræ et maris, quod terrarum figura (quatenus adhuc cognita est) respectu marium sit ad austrum angusta et veluti acuminata, ad septentriones lata et ampla; marium contra; et quod oceani magni intersecent terras alveis exporrectis inter austrum et septentriones, non inter orientem et occidentem; nisi forte in extremis regionibus polaribus. Etiam canones (qui nil aliud sunt quam observationes generales et catholicæ) optime ascribuntur; veluti in historia cœlestium, quod Venus nunquam distet a sole plus partibus 46, Mercurius 23; et quod planetæ qui supra solem locantur tardissime moveant, cum longissime a terra absint; planetæ infra solem celerrime. Aliud insuper observationis genus adhibendum, quod nondum in usum venit, licet sit haud exigui momenti. Illud tale est: nempe, ut subjungantur iis quæ sunt, ea quæ non sunt. Veluti in historia cœlestium, quod non inveniatur stella oblonga vel triangularis; sed quod omnis stella sit globosa; vel globosa simpliciter, ut luna, vel ad aspectum angulata sed in medio globosa, ut reliquæ stellæ, vel ad aspectum comata et in medio globosa, ut sol; aut quod stellæ nullo prorsus spargantur ordine; ut non inveniatur vel quincunx vel quadrangulum, nec alia figura perfecta (utcunque

imponantur nomina deltæ, coronæ, crucis, quadrigarum, etc.); vix etiam linea recta, nisi forte in cingulo et pugione Orionis.

Quinto, juvabit fortasse nonnihil quærentem, quod credentem prorsus pervertat et perdat: viz. ut opiniones quæ nunc receptæ sunt, cum earum varietate et sectis, brevi verborum complexu et tanquam in transitu recenseantur; ut intellectum vellicent, et nihil amplius.

X.

Atque hæc sufficient, quatenus ad præcepta generalia; quæ si diligenter observentur, et finem recta petet hoc opus historiæ, nec excrescet supra modum. Quod si etiam prout circumscribitur et limitatur vastum opus alicui pusillanimo videri possit, is in bibliothecas oculos convertat; et inter alia, corpora juris civilis aut juris canonici ex una parte spectet, et commentarios doctorum et jurisconsultorum ex altera; et videat quid intersit quoad molem et volumina. Nobis enim (qui, tanquam scribæ fideles, leges ipsas naturæ et nil aliud excipimus et conscribimus) brevitas competit, et fere ab ipsis rebus imponitur. Opinionum autem et placitorum et speculationum non est numerus neque finis.

Quod vero in Distributione Operis nostri mentionem fecimus *Cardinalium Virtutum* in natura, et quod etiam harum historia, antequam ad opus Interpretationis ventum fuerit, perscribenda esset; hujus rei minime obliti sumus, sed eam nobis ipsis reservavimus; cum de aliorum industria in hac re, priusquam homines cum natura paulo arctius consuescere incœperint, prolixe spondere non audeamus. Nunc itaque ad delineationem *Historiarum Particularium* veniendum.

Verum, prout nunc negotiis distringimur, non ulterius suppetit otium quam ut Catalogum tantum Historiarum Particularium secundum capita subjungamus. Enimvero cum primum huic rei vacare possimus, consilium est in singulis veluti interrogando docere, qualia sint circa unamquamque historiarum illarum potissimum inquirenda et conscribenda, tanquam ea quæ ad finem nostrum faciunt, instar *Topicorum* quorundam particularium; vel potius ut (sumpto exemplo a causis civilibus) in hac *Vindicatione Magna* sive *Processu*, a favore et providentia divina concesso et instituto (per quem genus humanum jus suum in naturam recuperare contendit), naturam ipsam et artes super articulos examinemus.

CATALOGUS

HISTORIARUM PARTICULARIUM,

SECUNDUM CAPITA.

1. Historia Cœlestium; sive Astronomica.
2. Historia Configurationis Cœli et partium ejus versus Terram et partes ejus: sive Cosmographica.
3. Historia Cometarum.
4. Historia Meteororum Ignitorum.
5. Historia Fulgurum, Fulminum, Tonitruum, et Coruscationum.
6. Historia Ventorum, et Flatuum Repentinorum, et Undulationum Aëris.
7. Historia Iridum.
8. Historia Nubium, prout superne conspiciuntur.
9. Historia Expansionis Cœruleæ, Crepusculi, plurium Solium, plurium Lunarum, Halonum, Colorum variorum Solis et Lunæ; atque omnis varietatis Cœlestium ad aspectum, quæ fit ratione medii.
10. Historia Pluviarum Ordinariarum, Procellosarum, et Prodigiosarum; etiam Cataractarum (quas vocant) Cœli; et similium.
11. Historia Grandinis, Nivis, Gelu, Pruinæ, Nebulæ, Roris, et similium.
12. Historia omnium aliorum Cadentium sive Descendentium ex alto, et superne generatorum.
13. Historia Sonituum in alto (si modo sint aliqui) præter Tonitrua.
14. Historia Aëris in Toto, sive in Configuratione Mundi.

15. Historia Tempestatum sive Temperamentorum Anni, tam secundum variationes Regionum, quam secundum accidentia Temporum et periodos Annorum; Diluviorum, Fervorum, Siccitatum, et similium.
16. Historia Terræ et Maris; Figuræ et Ambitus ipsorum et Configurationis ipsorum inter se, atque Exporrectionis ipsorum in latum aut angustum; Insularum Terræ in Mari, Sinuum Maris, et Lacuum salsorum in Terra, Isthmorum, Promontoriorum.
17. Historia Motuum (si qui sint) globi Terræ et Maris; et ex quibus Experimentis illi colligi possint.
18. Historia Motuum majorum et Perturbationum in Terra et Mari; nempe Terræ Motuum et Tremorum et Hiatuum, Insularum de novo enascentium, Insularum fluctuantium, Abruptionum Terrarum per ingressum Maris, Invasionum et Illuvionum, et contra Desertionum Maris; Eruptionum Ignium e Terra, Eruptionum subitanearum Aquarum e Terra, et similium.
19. Historia Geographica Naturalis, Montium, Vallium, Sylvarum, Planitierum, Arenarum, Paludum, Lacuum, Fluviorum, Torrentium, Fontium, et omnis diversitatis scaturiginis ipsorum, et similium; missis Gentibus, Provinciis, Urbibus, et hujusmodi Civilibus.
20. Historia Fluxuum et Refluxuum Maris, Euriporum, Undulationum et Motuum Maris aliorum.
21. Historia cæterorum Accidentium Maris; Salsuginis ejus, Colorum diversorum, Profunditatis: et Rupium, Montium, et Vallium submarinorum, et similium.

Sequuntur Historiæ Massarum Majorum.

22. Historia Flammæ, et Ignitorum.
23. Historia Aëris, in Substantia, non in Configuratione.
24. Historia Aquæ, in Substantia, non in Configuratione.
25. Historia Terræ et diversitatis ejus, in Substantia, non in Configuratione.

Sequuntur Historiæ Specierum.

26. Historia Metallorum perfectorum, Auri, Argenti; et Minerarum, Venarum, Marcasitarum eorundem: Operaria quoque in Mineris ipsorum.
27. Historia Argenti Vivi.
28. Historia Fossilium; veluti Vitrioli, et Sulphuris, etc.

29. Historia Gemmarum; veluti Adamantis, Rubini, etc.
30. Historia Lapidum; ut Marmoris, Lapidis Lydii, Silicis, etc.
31. Historia Magnetis.
32. Historia Corporum Miscellaneorum, quæ nec sunt Fossilia prorsus, nec Vegetabilia; ut Salium, Succini, Ambræ-griseæ, etc.
33. Historia Chymica circa Metalla et Mineralia.
34. Historia Plantarum, Arborum, Fruticum, Herbarum: et Partium eorum, Radicum, Caulium, Ligni, Foliorum, Florum, Fructuum, Seminum, Lachrymarum, etc.
35. Historia Chymica circa Vegetabilia.
36. Historia Piscium, et Partium ac Generationis ipsorum.
37. Historia Volatilium, et Partium ac Generationis ipsorum.
38. Historia Quadrupedum, et Partium ac Generationis ipsorum.
39. Historia Serpentum, Vermium, Muscarum, et cæterorum Insectorum; et Partium ac Generationis ipsorum.
40. Historia Chymica circa ea quæ sumuntur ab Animalibus.

Sequuntur Historiæ Hominis.

41. Historia Figuræ et Membrorum externorum Hominis, Staturæ, Compagis, Vultus, et Lineamentorum; eorumque varietatis secundum Gentes et Climata, aut alias minores differentias.
42. Historia Physiognomica super ipsa.
43. Historia Anatomica, sive Membrorum internorum hominis; et varietatis ipsorum, quatenus invenitur in ipsa naturali compage et structura, et non tantum quoad morbos et accidentia præternaturalia.
44. Historia partium similarium Hominis; ut Carnis, Ossium, Membranarum, etc.
45. Historia Humorum in Homine; Sanguinis, Bilis, Spermatis, etc.
46. Historia Excrementorum; Sputi, Urinarum, Sudorum, Sedimentorum, Capillorum, Pilorum, Rediviarum, Unguium, et similium.
47. Historia Facultatum; Attractionis, Digestionis, Retentionis, Expulsionis, Sanguificationis, Assimilationis alimentorum in membra, Versionis Sanguinis et Floris ejus in Spiritum, etc.

48. Historia Motuum Naturalium et Involuntariorum; ut Motus Cordis, Motus Pulsuum, Sternutationis, Motus Pulmonum, Motus Erectionis Virgæ, etc.
49. Historia Motuum mixtorum ex naturalibus et voluntariis; veluti Respirationis, Tussis, Urinationis, Sedis, etc.
50. Historia Motuum Voluntariorum; ut Instrumentorum ad voces articulatas; ut Motuum Oculorum, Linguæ, Faucium, Manuum, Digitorum; Deglutitionis, etc.
51. Historia Somni et Insomniorum.
52. Historia diversorum Habituum Corporis; Pinguis, Macilenti; Complexionum (quas vocant), etc.
53. Historia Generationis Hominum.
54. Historia Conceptionis, Vivificationis, Gestationis in Utero, Partus, etc.
55. Historia Alimentationis Hominis, atque omnis Edulii et Potabilis, atque omnis Diætæ; et Varietatis ipsorum secundum gentes aut minores differentias.
56. Historia Augmentationis et Incrementi Corporis in toto et partibus ipsius.
57. Historia Decursus Ætatis; Infantiæ, Pueritiæ, Juventutis, Senectutis, Longævitatis, Brevitatis Vitæ, et similium, secundum gentes et minores differentias.
58. Historia Vitæ et Mortis.
59. Historia Medicinalis Morborum, et Symptomatum et Signorum eorundem.
60. Historia Medicinalis Curæ et Remediorum et Liberationum a Morbis.
61. Historia Medicinalis eorum quæ conservant Corpus et Sanitatem.
62. Historia Medicinalis eorum quæ pertinent ad Formam et Decus Corporis, etc.
63. Historia Medicinalis eorum quæ corpus alterant, et pertinent ad Regimen Alterativum.
64. Historia Pharmaco-polaris.
65. Historia Chirurgica.
66. Historia Chymica circa Medicinas.
67. Historia Visus et Visibilium, sive Optica.
68. Historia Picturæ, Sculptoria, Plastica, etc.
69. Historia Auditus et Sonorum.
70. Historia Musica.

71. Historia Olfactus, et Odorum.
72. Historia Gustus, et Saporum.
73. Historia Tactus, et ejus Objectorum.
74. Historia Veneris, ut speciei Tactus.
75. Historia Dolorum corporeorum, ut speciei Tactus.
76. Historia Voluptatis et Doloris in genere.
77. Historia Affectuum; ut Iræ, Amoris, Verecundiæ, etc.
78. Historia Facultatum Intellectualium; Cogitativæ, Phantasiæ, Discursus, Memoriæ, etc.
79. Historia Divinationum Naturalium.
80. Historia Dignotionum, sive Diacrisium occultarum Naturalium.
81. Historia Coquinaria, et artium subservientium, veluti Macellaria, Aviaria, etc.
82. Historia Pistoria et Panificiorum, et artium subservientium, ut Molendinaria, etc.
83. Historia Vinaria.
84. Historia Cellaria, et diversorum generum Potus.
85. Historia Bellariorum et Confecturarum.
86. Historia Mellis.
87. Historia Sacchari.
88. Historia Lacticiniorum.
89. Historia Balneatoria, et Unguentaria.
90. Historia Miscellanea circa curam corporis; Tonsorum, Odorariorum, etc.
91. Historia Auri-fabrilis, et artium subservientium.
92. Historia Lanificiorum, et artium subservientium.
93. Historia Opificiorum e Serico et Bombyce, et artium subservientium.
94. Historia Opificiorum ex Lino, Cannabio, Gossipio, Setis, et aliis Filaceis; et artium subservientium.
95. Historia Plumificiorum.
96. Historia Textoria, et artium subservientium.
97. Historia Tinctoria.
98. Historia Coriaria, Alutaria, et artium subservientium.
99. Historia Culcitraria et Plumaria.
100. Historia Ferri-Fabrilis.
101. Historia Latomiæ sive Lapicidarum.
102. Historia Lateraria, et Tegularia.
103. Historia Figularis.

104. Historia Cæmentaria, et Crustaria.
105. Historia Ligni-Fabrilis.
106. Historia Plumbaria.
107. Historia Vitri et omnium Vitreorum et Vitriaria.
108. Historia Architecturæ in genere.
109. Historia Plaustraria, Rhedaria, Lecticaria, etc.
110. Historia Typographica, Libraria, Scriptoria, Sigillatoria; Atramenti, Calami, Papyri, Membranæ, etc.
111. Historia Ceræ.
112. Historia Viminaria.
113. Historia Storearia, et Opificiorum ex Stramine, Scirpis, et similibus.
114. Historia Lotricaria, Scoparia, etc.
115. Historia Agriculturæ, Pascuariæ, Cultus Sylvarum, etc.
116. Historia Hortulana.
117. Historia Piscatoria.
118. Historia Venationis et Aucupii.
119. Historia Rei Bellicæ, et artium subservientium; ut Armamentaria, Arcuaria, Sagittaria, Sclopetaria, Tormentaria, Balistaria, Machinaria, etc.
120. Historia Rei Nauticæ, et Practicarum et artium subservientium.
121. Historia Athletica, et omnis generis Exercitationum Hominis.
122. Historia Rei Equestris.
123. Historia Ludorum omnis generis.
124. Historia Præstigiatorum et Circulatorum.
125. Historia Miscellanea diversarum Materiarum Artificialium; ut Esmaltæ, Porcellanæ, complurium Cæmentorum, etc.
126. Historia Salium.
127. Historia Miscellanea diversarum Machinarum, et Motuum.
128. Historia Miscellanea Experimentorum Vulgarium, quæ non coaluerunt in Artem.

Etiam Mathematicarum purarum Historiæ conscribendæ sunt, licet sint potius observationes quam experimenta.

129. Historia naturarum et potestatum Numerorum.
130. Historia naturarum et potestatum Figurarum.

Non abs re fuerit admonere quod, cum necesse sit multa ex experimentis sub duobus titulis vel pluribus cadere (veluti Historia Plantarum, et Historia Artis Hortulanæ multa habebunt fere communia), commodior sit Inquisitio per Artes, Dispositio vero per Corpora. Parum enim nobis curæ est de artibus ipsis mechanicis, sed tantum de iis quæ afferunt ad instruendam Philosophiam.

Verum hæc e re nata melius regentur.

FINIS.

DE

AUGMENTIS SCIENTIARUM.

PREFACE.

In a letter dated June 30, 1622, Bacon speaks of the *De Augmentis Scientiarum* as a work already in the hands of translators, and likely to be finished by the end of the summer. "Librum meum de progressu Scientiarum traducendum commisi. Illa translatio, volente Deo, sub finem æstatis perficietur."[1] Therefore, though it was not published till the autumn of 1623, it may be considered as coming, in order of composition, next among the Philosophical works to the *Novum Organum* and *Parasceve*.

It was intended to serve for the first part of the Instauratio Magna, according to the plan laid out in the *Distributio Operis*, —the part which is there entitled *Partitiones Scientiarum*, and described as exhibiting a complete survey of the world of human knowledge as it then was, — "Scientiæ ejus sive doctrinæ in cujus possessione humanum genus hactenus versatur summam sive descriptionem universalem." The relation which it bears to the rest of the work is best explained in the dedicatory letter prefixed to the *Dialogue of a Holy War*. "And again, for that my book of Advancement of Learning may be some preparative or key for the better opening of the Instauration, because it exhibits a mixture of new conceits and old, whereas the Instauration gives the new unmixed, otherwise than with some aspersion of the old for taste's sake, I have thought good to procure a translation of that book into the general language, not without great and ample additions and enrichment thereof, especially in the second book, which handleth the partition of sciences; in such sort as I hold it[2] may

[1] Letter to Father Redempt. Baranzan.

[2] That is, the second book; as appears more clearly from the Latin version of this letter, which was written later. "Idque ita cumulate præstiti ut judicem *librum illum jam in plures divisum*, pro primâ Instaurationis parte haberi posse, quam *Partitionum Scientiarum* nomine antea insignivi."

serve in lieu of the first part of the Instauration, and acquit my promise in that part."

But why, when Bacon determined to fit this work for that part, did he not give it the proper title? Curious as he always was in the choice of names, why not call it "*Partitiones* Scientiarum," which describes the proper business of the first part of the Instauratio, instead of "De *dignitate et augmentis* Scientiarum," which passes it by?

The answer, I think, is that he felt it would be inappropriate. The form in which the *De Augmentis* was cast retained so strong an impress of the original design out of which it grew, — a design truly and exactly described in the title, and having no immediate reference to the ultimate plan of the Instauratio, — that another title referring to another design would have been manifestly unfit. When he wrote the Advancement of Learning, he was already engaged upon a work concerning the Interpretation of Nature, which (to judge from the fragments and sketches that remain) was meant to begin at once where the *Novum Organum* begins, without any preliminary review of the existing condition of knowledge; a work corresponding to that which in the foregoing extract he calls "the Instauration," as distinguished from the Advancement of Learning, which was to serve as "a preparative or key" to it; and the writing of a book which should exhibit a complete and particular survey of the state of knowledge then extant in the world was, I suspect, a by-thought suggested by a particular accident.

However Bacon may have underrated the difficulties of the reform which he proposed, he was well aware that it could not be carried into effect by a private man. A private man might suggest the course, and produce a specimen; but the execution of the work on a scale of adequate magnitude required the means and influence of a King or a Pope. Now it happened, by a very singular accident, that while he was engaged in considering and maturing his plan there succeeded to the throne of England a man whose tastes and previous training qualified him more than most other men to take an earnest, active, and intelligent interest in it. James the First was a man of peace by principle and inclination, of solid, various, and extensive learning, and of great intellectual activity. It is difficult even now to say why he might not have proved, in the province of letters, a great governor. At that time, when his

faults were not yet known, he must have appeared like the very man for such an office. To Bacon it would naturally seem an object of the first importance to engage him, if possible, as a patron of the new philosophy; and, as men's minds are most impressible in times of transition, he would wish to lose no time in attempting to give his ambition a turn in that direction, while his fortune was fresh, his course unsettled, his imagination excited and open to great ideas. For this purpose, however, the work on the Interpretation of Nature was not forward enough to be available, nor very fit perhaps in itself, had it been more forward than it was. The idea was too new, the scheme too vast, the end too remote, to engage the serious attention of a king nearly forty years old, who had been bred in the ancient learning and attained a proficiency in it of which he was proud. "Restat unica salus ac sanitas ut opus mentis universum de integro resumatur" was an avowal which might well startle him. Not so a work representing the state of human science as it was, and the means of perfecting and extending it in many new directions. This lay in James's own province; of the review of what had been already done few men of his time were better qualified to judge; few perhaps were more likely to be attracted and excited by the prospect of doing more. Now Bacon's own travels in search of the light he had been looking for had carried him over the whole surface of the intellectual globe; and he was therefore well qualified to report upon the condition of it,—to declare how far and in what directions the dominion of knowledge had been already advanced, what regions were still unexplored and unsubdued, and what measures might best be taken to bring them into subjection. Such a representation was likely enough to make an impression on a mind constituted and trained like that of James the First. Possibly it might even rouse him to take up the extension of knowledge as a royal business; in which case the new philosophy would have started with advantages not otherwise to be hoped for.

This work therefore Bacon seems to have set about at once. There is reason to believe that the first book of the Advancement of Learning, which treats of the excellence and dignity of knowledge as a pursuit for kings and statesmen, was written in 1603, immediately after James's accession; and the second, which treats of the deficiencies remaining and the sup-

plies required, in 1605; the intervening year of 1604 having been too much occupied with civil business to allow much leisure for the prosecution of a work of that kind. It was important to push it forward as fast as possible, even at the expense of completeness: for the very object for which I suppose it to have been undertaken,—that of making an impression on the king's mind while it was in the best state to receive impressions,—would have been lost by delay; and accordingly in the autumn of 1605 appeared "the Twoo Bookes of Francis Bacon, of the proficience and advancement of Learning, divine and humane;" with many marks of haste in form and composition, and even in substance not altogether adequate to the argument in hand, but nevertheless well enough adapted for its immediate purpose, if I have rightly conjectured what that purpose was.

If this be the true history of the Advancement of Learning, the rest follows naturally. The stroke, though well aimed, was not successful. The book may have raised James's opinion of Bacon, but it did not inspire him with any zeal for the Great Instauration. There it was, however; and it contained such a quantity of the best fruits of Bacon's mind and so many new views bearing on the great reform which he meditated, that it seemed a pity not to find a place for it in the great work. This was easily done by enlarging the original design so as to include a preliminary survey of the existing state of knowledge; in which case the substance of the second book of the Advancement might do duty as the first part of the Instauratio Magna. If we knew when the fragment entitled *Partis Instaurationis Secundæ Delineatio* was written, we might almost fix the time at which this enlargement of the original design was resolved upon. For in that fragment Bacon proposes to distribute the whole subject of the Interpretation of Nature through the second, third, fourth, fifth, and sixth parts of the work, exactly as in the *Distributio Operis;* a place being reserved for a first part, though the nature of its contents is not specified. And from the *Descriptio Globi Intellectualis*, which was written in 1612 and appears, as I have elsewhere remarked, to be a commencement of the *Partitiones Scientiarum* itself, we may partly infer the form in which he then intended to cast that part.

Why he afterwards altered his intention and resolved to con-

ent himself with a mere translation of the two books of the Advancement with additions, it is not difficult to conjecture, if we take into account the circumstances of his life. When the *Novum Organum* was published in October 1620, the king had just resolved to call a new Parliament after six years' intermission, and questions of vital interest both at home and abroad hung upon the issue of it. The necessary preparations for the session, Bacon's own impeachment which almost immediately followed, a severe illness consequent upon that, his condemnation and imprisonment, negotiations with importunate creditors, and the composition of the *History of Henry the Seventh*, which was finished in October 1621, must have given him occupation enough during the next twelve months. Then came the question, how he was to proceed with the Instauratio, so as to make the most of such time and means as remained. Sixty-two years old, with health greatly impaired, an income scarcely sufficient to live upon, and an establishment of servants much reduced, he could not afford to waste labour upon things not essential. The Novum Organum was not half finished. The Natural History was not even begun, and no fellow-labourer had yet come forward to help in it.[1] It was only in the completion of the first of the six parts that he could hope for material assistance from others. Even this, if he had attempted to recast it in the form which I suppose him to have designed,—the form indicated in the *Descriptio Globi Intellectualis*,—he could hardly have executed by deputy; whereas a translation of the Advancement of Learning might be so executed, and would need only corrections and additions to make it a complete survey of the intellectual globe, adequate in substance to its place, though not symmetrical in form. Accordingly, "by help of some good pens which did not forsake him," he proceeded at once to put this in train, and then turned his own attention to the Natural History, which he considered as "*basis totius negotii.*"

Concerning the causes which delayed the publication of the *De Augmentis* a twelvemonth beyond the expected time, I have no information. But it is probable that the additions which suggested themselves as he proceeded were far larger than he had anticipated; being indeed in the second book as much again as the original, and more. The measures which he took

[1] "Neque huic rei deero quantum in me est. Utinam habeam et adjutores idoneos."—*Letter to Father Redempt. Baranzan*, 30 June, 1622.

however were in this instance quite successful; and by sacrificing a little symmetry of form, he succeeded in effectually preserving the substance of this first part of his great work.[1]

Tenison mentions "Mr. Herbert"—that is, George Herbert, the poet—as one of the translators employed. But we have it upon Rawley's authority that Bacon took a great deal of pains with it himself (proprio marte plurimum desudavit)—so that we must consider the whole translation as stamped with his authority. Many years before he had asked Dr. Playfer to do it; who (according to Tenison) sent him a specimen, but "of such superfine Latinity, that the Lord Bacon did not encourage him to labour further in that work, in the penning of which he desired not so much neat and polite, as clear masculine and apt expression."[2] And it is not improbable that some such difficulty may have occurred. But Playfer's failure may be sufficiently accounted for by the state of his health. A memorandum in the *Commentarius Solutus* dated 26 July, 1608 —"Proceeding with the translation of my book of Advancement of Learning—hearkening to some other if Playfer should fail,"—shows that at that time it was still in his hands; and he died at the beginning of the next year.

I have only to add that all the notes to this work which bear no signature are Mr. Ellis's, except such parts of them as are inserted within brackets. These, as well as all notes signed J. S., are mine.

J. S.

[1] The volume in which it originally appeared bore the following general titlepage: *Opera Francisci Baronis de Verulamio, vice-comitis Sancti Albani, Tomus primus. Qui continet* De Augmentis Scientiarum *libros IX. Ad regem suum. Londini, in officina Joannis Haviland, MDCXXIII.* But this had reference to a collection (which he then meditated) of all his works, in Latin; not to the order of the *Instauratio*, which was not in a condition to be published consecutively. See *Epistola ad Fulgentium*: Opuscula, p. 172.

[2] Baconiana, p. 26.

GULIELMUS RAWLEY

SACRÆ THEOLOGIÆ PROFESSOR,

ILLUSTRISSIMI DOMINI D. FRANCISCI BARONIS DE VERULAMIO, VICE-COMITIS SANCTI ALBANI, SACELLANUS,

LECTORI S.

Cum Domino meo placuerit eo me dignari honore, ut in edendis operibus suis opera mea usus sit; non abs re fore existimavi, si lectorem de aliquibus quæ ad hunc primum tomum pertinent breviter moneam. Tractatum istum de *Dignitate et Augmentis Scientiarum* ante annos octodecim edidit Dominatio sua lingua patria, in duos tantummodo libros distributum; et Regiæ suæ Majestati dicavit quod et nunc facit. Non ita pridem animum adjecit ut in Latinam linguam verteretur. Inaudierat siquidem illud apud exteros expeti. Quinetiam solebat subinde dicere *libros modernis linguis conscriptos non ita multo post decocturos.* Ejus igitur translationem, ab insignioribus quibusdam eloquentia viris elaboratam, propria quoque recensione castigatam, jam emittit. Ac liber primus certe quasi mera translatio est, in paucis admodum mutatus: At reliqui octo, qui *Partitiones Scientiarum* tradunt, atque unico ante libro continebantur, ut novum opus, et nunc primum editum, prodit. Caussa autem præcipua quæ Dominationem suam movit ut opus hoc retractaret et in plurimis amplificaret, ea fuit; quod in *Instauratione Magna* (quam diu postea edidit) *Partitiones Scientiarum* pro prima Instaurationis parte constituit; quam sequeretur *Novum Organum;* dein *Historia Naturalis;* et sic deinceps. Cum igitur reperiret Partem eam de *Partitionibus Scientiarum* jam pridem elaboratam (licet minus solide quam argumenti dignitas postularet), optimum fore putavit si retractaretur, et redigeretur in opus justum et completum. Atque hoc pacto fidem suam liberari intelligit de prima parte Instaurationis præstitam. Quantum ad opus ipsum, non est tenuitatis meæ

de eo aliquid præfari. Præconium ei quod optime conveniat existimo futurum illud, quod Demosthenes interdum dicere solebat de rebus gestis Atheniensium veterum; *Laudatorem iis dignum esse solummodo Tempus.* Deum Opt: Max: obnixe precor, ut pro dignitate operis fructus uberes diuturnique et auctori et lectori contingant.

FRANCISCI BARONIS DE VERULAMIO,

VICE-COMITIS SANCTI ALBANI,

DE

DIGNITATE ET AUGMENTIS SCIENTIARUM

LIBRI IX.

AD REGEM SUUM.

PARTITIONES SCIENTIARUM,

ET

ARGUMENTA SINGULORUM CAPITUM.

LIBER II.[1]

Caput i.

Partitio Universalis Doctrinæ Humanæ, in *Historiam, Poesim, Philosophiam;* secundum tres Facultates Intellectus, *Memoriam, Phantasiam, Rationem;* quodque eadem partitio competat etiam Theologicis.

Cap. ii.

Partitio Historiæ in *Naturalem* et *Civilem; Ecclesiastica* et *Literaria* sub Civili comprehensis. Partitio Historiæ Naturalis, ex Subjecto suo, in Historiam *Generationum, Præter-Generationum,* et *Artium.*

Cap. iii.

Partitio Historiæ Naturalis secunda, ex Usu et Fine suo, in *Narrativam,* et *Inductivam:* quodque Finis nobilissimus Historiæ Naturalis sit, ut ministret et in ordine sit ad *condendam Philosophiam;* quem Finem intuetur *Inductiva.* Partitio Historiæ Generationum in Historiam *Cœlestium,* Historiam *Meteorum,* Historiam *Globi Terræ et Maris,* Historiam *Massarum* sive *Collegiorum Majorum,* et Historiam *Specierum,* sive *Collegiorum Minorum.*

Cap. iv.

Partitio Historiæ Civilis in *Ecclesiasticam, Literariam,* et (quæ generis nomen retinet) *Civilem:* quodque Historia *Literaria* desideretur. Ejus conficiendæ præcepta.

[1] The argument of the first book is not alluded to here, but may be sufficiently described as *De Dignitate Scientiarum.* That book is to be considered as a kind of inaugural address. The business begins with the second. — *J. S.*

CAP. V.

De dignitate et difficultate Historiæ Civilis.

CAP. VI.

Partitio prima Historiæ Civilis (Specialis) in *Memorias, Antiquitates,* et *Historiam Justam.*

CAP. VII.

Partitio Historiæ Justæ, in *Chronica Temporum, Vitas Personarum,* et *Relationes Actionum.* Earum partium explicatio.

CAP. VIII.

Partitio Historiæ Temporum, in Historiam *Universalem* et *Particularem.* Utriusque commoda, et incommoda.

CAP. IX.

Partitio secunda Historiæ Temporum, in *Annales* et *Acta Diurna.*

CAP. X.

Partitio secunda Historiæ Civilis (Specialis), in *Meram* et *Mixtam.*

CAP. XI.

Partitio Historiæ Ecclesiasticæ, in *Ecclesiasticam Specialem, Historiam ad Prophetias,* et *Historiam Nemeseos.*

CAP. XII.

De *Appendicibus* Historiæ, quæ circa Verba hominum (quemadmodum Historia ipsa circa Facta) versantur: Partitio earum in *Orationes, Epistolas,* et *Apophthegmata.*

CAP. XIII.

De secundo membro principali Doctrinæ Humanæ, nempe *Poesi.* Partitio Poeseos in *Narrativam, Dramaticam,* et *Parabolicam.* Exempla Parabolicæ tria proponuntur.

LIBER III.

CAP. I.

Partitio Scientiæ, in *Theologiam* et *Philosophiam.* Partitio Philosophiæ in Doctrinas tres: De *Numine,* De *Natura,* De *Homine.* Constitutio *Philosophiæ Primæ,* ut Matris communis omnium.

Cap. II.

De *Theologia Naturali;* et *Doctrina de Angelis et Spiritibus,* quæ ejusdem est Appendix.

Cap. III.

Partitio Naturalis Philosophiæ, in *Speculativam* et *Operativam;* quodque illæ duæ et in intentione tractantis et in corpore tractatus segregari debeant.

Cap. IV.

Partitio Doctrinæ Speculativæ de Natura, in *Physicam* (Specialem), et *Metaphysicam:* quarum Physica *Caussam Efficientem,* et *Materiam,* Metaphysica *Caussam Finalem,* et *Formam,* inquirit. Partitio Physicæ (Specialis) in Doctrinas de *Principiis Rerum,* de *Fabrica Rerum* sive de *Mundo,* et de *Varietate Rerum.* Partitio Doctrinæ de Varietate Rerum, in Doctrinam de *Concretis* et Doctrinam de *Abstractis.* Partitio Doctrinæ de *Concretis* rejicitur ad easdem partitiones quas suscipit Historia Naturalis. Partitio Doctrinæ de Abstractis, in Doctrinam de *Schematismis Materiæ* et Doctrinam de *Motibus.* Appendices duæ Physicæ Speculativæ: *Problemata Naturalia, Placita Antiquorum Philosophorum.* Partitio Metaphysicæ, in Doctrinam de *Formis* et Doctrinam de *Caussis Finalibus.*

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Cap. I.

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Cap. III.

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LIBER V.

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CAP. I.

Partitio Traditivæ, in Doctrinam de *Organo Sermonis*, Doctrinam de *Methodo Sermonis*, et Doctrinam de *Illustratione Sermonis*. Partitio Doctrinæ de Organo Sermonis, in Doctrinam de *Notis Rerum*, de *Locutione*, et de *Scriptione:* quarum duæ Posteriores *Grammaticam* constituunt, ejusque Partitiones sunt. Partitio Doctrinæ de Notis Rerum, in *Hieroglyphica*, et *Characteres Reales*. Partitio secunda Grammaticæ, in *Literariam*, et *Philosophantem*. Aggregatio *Poëseos quoad Metrum* ad Doctrinam de Locutione. Aggregatio *Doctrinæ de Ciphris* ad Doctrinam de Scriptione.

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Doctrina de Methodo Sermonis constituitur ut Pars Traditivæ Substantiva et Principalis. Nomen ei inditur *Prudentia Traditivæ*. Enumerantur Methodi genera diversa; et subjunguntur eorum commoda, et incommoda.

CAP. III.

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Cap. I.

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Cap. II.

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Cap. III.

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LIBER IX.

Cap. I.

Partitiones Theologiæ Inspiratæ omittuntur: tantum Aditus fit ad Desiderata tria; Doctrinam de *Legitimo Usu Rationis Humanæ in Divinis*, Doctrinam de *Gradibus Unitatis in Civitate Dei*, et *Emanationes Scripturarum*.

FRANCISCI BARONIS DE VERULAMIO,

VICE-COMITIS SANCTI ALBANI,

DE DIGNITATE ET AUGMENTIS SCIENTIARUM,

LIBER PRIMUS.

Sub veteri Lege, Rex Optime, erant et spontaneæ oblationes et quotidiana sacrificia; hæc ex rituali cultu, illæ ex pia alacritate profectæ. Arbitror equidem deberi tale quidpiam regibus a servis suis; ut scilicet quisque non solum muneris sui tributa, sed et amoris pignora deferat. Atque in prioribus illis spero me minime defuturum; in posteriori autem genere, dubitavi quid potissimum sumerem: satius autem visum est hujusmodi aliquid deligere, quod potius ad personæ tuæ excellentiam quam ad negotia coronæ spectaret.

Ego sæpissime de Majestate tua, ut debeo, cogitans, (missis aliis sive virtutis sive fortunæ tuæ dotibus) magna prorsus afficior admiratione, cum intueor excellentiam earum in to virtutum facultatumque, quas philosophi intellectuales vocant: capacitatem ingenii tot et tanta complexam, firmitudinem memoriæ, prehensionis velocitatem, judicii penetrationem, elocutionisque ordinem simul et facilitatem. Subit profecto animum quandoque dogma illud Platonicum, quo asseritur, *Scientiam nihil aliud esse quam Reminiscentiam; animumque naturaliter omnia cognoscere, nativæ luci, quam specus corporis obumbraverat, subinde redditum.*[1] Certe hujus rei (si in quo alio) relucet in Majestate tua exemplum insigne; cui adeo prompta est mens ad concipiendam flammam, ubi vel levissima eam excitaverit objecta occasio, vel minima alienæ cognitionis scintilla affulserit. Quemadmodum igitur de regum sapientissimo Sacra perhibet Scriptura, *Cor illi fuisse tanquam arenam maris*[2],

[1] See the Phædo, p. 75., and other places in Plato's works; particularly the beginning of the Meno. And compare Arist. *Anal. Pri.* ii. 21., where the passage in the Meno is referred to.

[2] 1 Kings, 4. 29.

cujus quanquam massa prægrandis, partes tamen minutissimæ; sic mentis indidit Deus Majestati tuæ crasim plane mirabilem, quæ cum maxima quæque complectatur, minima tamen prehendat nec patiatur effluere: cum perdifficile videatur vel potius impossibile in natura, ut idem instrumentum et grandia opera et pusilla apte disponat. Quantum ad elocutionem tuam, occurrit illud Cornelii Taciti de Augusto Cæsare; *Augusto,* inquit, *profluens, et quæ principem virum deceret, eloquentia fuit.*[1] Sane si recte rem perpendamus, omnis oratio aut laboriosa aut affectata aut imitatrix, quamvis alioquin excellens, nescio quid servile olet, nec sui juris est. Tuum autem dicendi genus vere regium est, profluens tanquam a fonte, et nihilominus, sicut naturæ ordo postulat, rivis diductum suis, plenum facilitatis fœlicitatisque, imitans neminem nemini imitabile. Atque sicut in rebus tuis quæ tam ad regnum quam ad domum tuam spectant, virtus videtur cum fortuna certare; mores scilicet optimi cum fœlici regimine; spes tuæ olim patienter et pie cohibitæ, cum fausta et opportuna speratorum adeptione; tori conjugalis sancta fides, cum fructu conjugii beato in sobole pulcherrima; pia et principe Christiano dignissima ad pacem propensio, cum simili vicinorum principum inclinatione in idem votum fœliciter conspirantium; sic et in intellectus tui dotibus non levior exoritur lis et æmulatio, si eas quæ a natura ipsa præbitæ sunt et infusæ cum instructissima gaza multiplicis eruditionis et plurimarum artium scientia committamus. Neque vero facile fuerit regem aliquem post Christum natum reperire, qui fuerit Majestati tuæ literarum divinarum et humanarum varietate et cultura comparandus. Percurrat qui voluerit imperatorum et regum seriem, et juxta mecum sentiet. Magnum certe quiddam præstare reges videntur, si delibantes aliorum ingenia ex compendio sapiant, aut in cortice doctrinæ aliquatenus hæreant, aut denique literatos ament evehantque. At regem, et regem natum, veros eruditionis fontes hausisse, imo ipsummet fontem eruditionis esse, prope abest a miraculo. Tuæ vero Majestati etiam illud accedit, quod in eodem pectoris tui scrinio Sacræ Literæ cum profanis recondantur; adeo ut cum Hermete illo Trismegisto triplici gloria insigniaris, potestate Regis, illuminatione Sacer-

[1] "Augusto prompta ac profluens, quæ deceret principem, eloquentia fuit."—*Ann.* xiii. c. 3.

dotis, eruditione Philosophi.[1] Cum igitur alios reges longe hac laude (proprie quæ tua est) superes, æquum est ut non solum præsentis sæculi fama et admiratione celebretur, aut etiam historiarum lumine posteritati transmittatur, verum ut solido aliquo in opere incidatur, quod et regis magni potentiam denotet, et regis tam insigniter docti imaginem referat.

Quare (ut ad incœptum revertar) nulla potior mihi visa est oblatio, quam tractatus aliquis eo spectans. Hujus argumentum duabus constabit partibus. In priori (quæ levior est, neque tamen ullo modo prætermittenda) de Scientiæ et Literarum per omnia excellentia agendum est; et simul de merito eorum, qui in iisdem provehendis operam strenue et cum judicio impendunt. Posterior vero pars (quod caput rei est) proponet, quid in hoc genere huc usque actum sit et perfectum; insuper et ea perstringet quæ videntur desiderari; ut quamvis non ausim seponere aut deligere tuæ quod præcipue Majestati commendem, tamen multa et varia repræsentando regias tuas cogitationes excitare possim, ut proprios pectoris tui thesauros excutias, atque inde, pro magnanimitate tua atque sapientia, optima quæque, ad Artium et Scientiarum terminos proferendos, depromas.

In ipso vestibulo prioris partis, ad purgandam viam et quasi indicendum silentium, quo melius audiantur testimonia de dignitate literarum absque oblatratione tacitarum objectionum, statui primo loco liberare literas opprobriis et vilipendiis quibus impetit eas ignorantia, sed ignorantia sub non uno schemate; modo in theologorum zelotypia, modo in politicorum supercilio, modo in ipsorum literatorum erroribus sese ostentans et prodens. Audio primos dicentes, Scientiam inter ea esse quæ parce cauteque admittenda sunt; Scientiæ nimium appetitum fuisse primum peccatum, unde hominis lapsus; hodieque hærere serpentinum quid in ea, siquidem ingrediens tumorem inducit; *Scientia inflat*[2]: Salomonem censere, *Faciendi libros nullum esse finem, multamque lectionem carnis esse afflictionem*[3]; et alibi, *In multa sapientia multam esse indignationem*; et *Qui auget*

[1] "A noble philosopher, priest, and king of Egypt, whom our writer," says Philemon Holland, commenting on Ammianus Marcellinus, "calleth termaximus, others trismegistus in the same sense, for that he was Philosophus Maximus, Sacerdos Maximus, and Rex Maximus." There is however no doubt that the real Hermes, or the writer of the works ascribed to him, was a neophyte platonist of the second or third century. V. Heeren, *Comment. de Fontibus Eclog. J. Stobæi*," § 41.

[2] 1 Corinth. 8. 1.

[3] Ecclesiast. 12. 12.

scientiam, augere et dolorem[1]: D. Pauli monitum esse, *Ne decipiamur per inanem philosophiam*[2]: quin et experientia notum esse, doctissimos viros hæreticorum Coryphæos, doctissima sæcula in atheismum proclivia fuisse; contemplationem denique secundarum causarum authoritati primæ causæ derogare.

Ut igitur falsitatem hujus dogmatis fundamentaque ejus male jacta aperiamus, cuivis obviam est istos non percipere, scientiam quæ lapsum peperit non fuisse puram illam primigeniamque scientiam naturalem, cujus lumine Homo animalibus in Paradiso adductis nomina ex natura imposuit[3], sed superbam illam *Boni et Mali*, per quam excutere Deum sibique ipse legem figere ambivit. Neque certe vis ulla scientiæ, quanta quanta sit, inflat mentem; cum nihil implere animum, nedum distendere possit, præter Deum Deique contemplationem; quare Salomon, de duobus palmariis inventionis sensibus (visu atque auditu) loquens, ait *Oculum videndo, aurem audiendo non satiari*[4]; quod si non sit impletio, sequitur continens majus esse contento. Haud aliter de scientia ipsa animoque humano (cui sensus sunt tanquam emissarii) definit his verbis, quæ Calendario suo Ephemeridique omnium rerum tempora describenti subnectit, ita concludens; *Omnia Deus condidit, ut unumquodque pulcrum sit in tempore suo: mundam quoque ipsum indidit cordi eorum: invenire tamen homo non potest opus quod operatus est Deus ab initio usque ad finem.*[5] Quibus verbis haud obscure innuit Deum fabricatum esse animum humanum instar speculi totius mundi capacem, ejusque non minus sitientem quam oculum luminis; neque gestientem solum conspicere varietates vicissitudinesque temporum, verum etiam perscrutandi explorandique immotas atque inviolabiles naturæ leges et decreta ambitiosum. Et quamvis innuere videatur summam illam naturæ œconomiam (quam appellat *Opus quod operatur Deus ab initio usque ad finem*[6]) non posse inveniri ab homine, hoc non detrahit captui humano, sed in impedimenta doctrinæ rejiciendum; qualia sunt vitæ brevitas, studiorum divortia, scientiarum traditio prava et

[1] Ecclesiast. 1. 18. [2] Coloss. 2. 8.

[3] This reference to the imposition of names in Paradise in illustration of natural knowledge, is common in the writings of the schoolmen. Thus S. Thomas Aquinas in discussing the question "utrum primus homo habuerit scientiam omnem," after stating objections alleged against the affirmative opinion, thus commences his refutation of them. "Sed contra est quod ipse imposuit nomina animalibus, ut dicitur Gen. 2. Nomina autem debent naturis rerum congruere; Ergo Adam scivit naturas omnium animalium, et pari ratione habuit omnium aliorum scientiam."

[4] Ecclesiast. 1. 8. [5] Ecclesiast. 3. 11. [6] Proverbs, xx. 27

infida, plurimaque alia incommoda quibus humana conditio irretitur. Siquidem nullam universi partem ab humana disquisitione alienam esse satis clare alibi docet, inquiens, *Spiritus hominis est tanquam lucerna Dei*, qua intima arcana explorat. Quare si tanta sit amplitudo captus humani, manifestum est nullum esse periculum a quantitate scientiæ, utut diffusa, ne aut tumorem inducat aut excessum; sed a qualitate tantum, quæ quantulacunque sit, si absque antidoto sua sumatur, malignum quid habet atque venenosum, flatuosis symptomatis plenissimum. Hæc antidotus sive aroma (cujus mixtio temperat scientiam eamque saluberrimam efficit) est *charitas*, quod etiam priori clausulæ subjungit Apostolus, dicens, *Scientia inflat, charitas autem ædificat.* Cui consonum est, quod alibi docet; *Si*, inquit, *linguis loquar Angelorum vel hominum, charitatem autem non habeam, factus sum velut æs resonans aut cymbalum tinniens.*[1] Non quin eximium quid sit loqui linguis Angelorum et hominum, sed quia si segregetur a charitate neque ad commune humani generis bonum dirigatur, potius inanem gloriam exhibebit quam solidum fructum. Censuram quod attinet Salomonis de excessu legendi scribendique libros, et cruciatu spiritus e scientia oriundo, monitumque etiam Paulinum *Ne decipiamur per inanem philosophiam*[2]; si recte explicentur ea loca, optime ostendent veros cancellos et limites quibus humana scientia circumsepitur, ita tamen ut liberum sit ei absque omni coarctatione universam rerum naturam amplecti. Sunt enim limites tres. Primus, ne ita fœlicitatem collocemus in scientia, ut interim mortalitatis nostræ oblivio subrepat. Secundus, ne sic utamur scientia ut anxietatem pariat, non animi tranquillitatem. Tertius, ne putemus posse nos per naturæ contemplationem mysteria divina assequi. Nam quantum ad primum, optime in eodem libro alibi se Salomon explicat, *Satis*, inquit, *perspexi sapientiam tantum recedere a stultitia, quantum lucem a tenebris. Sapientis oculi in capite ejus, stultus in tenebris oberrat; sed simul didici moriendi necessitatem utrique esse communem.*[3] De secundo certum est, nullam animi anxietatem aut perturbationem oriri e scientia, nisi tantum per accidens. Omnis enim scientia, et admiratio (quæ est semen scientiæ), per se jucunda est; cum autem conclusiones inde deducuntur, quæ oblique rebus nostris applicatæ vel infirmos metus gignunt vel immodicas cupiditates, tum demum

[1] 1 Corinth. xiii. 1. [2] Coloss. ii. 8. [3] Ecclesiast. ii. 13, 14.

nascitur cruciatus ille et perturbatio mentis qua de loquimur; tunc enim scientia non est amplius *lumen siccum* (ut voluit Heraclitus ille obscurus, *Lumen siccum optima anima*[1]) sed fit lumen madidum, atque humoribus affectuum maceratum. Tertia regula accuratiorem paulo disquisitionem postulat, neque sicco pede prætereunda est. Si quis enim ex rerum sensibilium et materiatarum intuitu tantum luminis assequi speret quantum ad patefaciendam divinam naturam aut voluntatem sufficiet, *næ iste decipitur per inaniam philosophiam.* Etenim contemplatio creaturarum, quantum ad creaturas ipsas, producit scientiam; quantum ad Deum, admirationem tantum, quæ est quasi abrupta scientia. Ideoque scitissime dixit quidam Platonicus[2]; *Sensus humanos solem referre, qui quidem revelat terrestrem globum, cœlestem vero et stellas obsignat:* sic sensus reserant naturalia, divina occludunt. Atque hinc evenit, nonnullos e doctiorum manipulo in hæresim lapsos esse, quum ceratis sensuum alis innixi ad divina evolare contenderent. Namque eos qui autumant nimiam scientiam inclinare mentem in atheismum, ignorantiamque secundarum causarum pietati erga primam obstetricari, libenter compellarem Jobi quæstione, *An oporteat mentiri pro Deo, et ejus gratia dolum loqui conveniat, ut ipsi gratificemur?*[3] Liquet enim Deum nihil operari ordinario in natura nisi per secundas causas, cujus diversum credi si vellent, impostura mera esset, quasi in gratiam Dei, et nihil aliud quam authori veritatis immundam mendaci hostiam immolare. Quin potius certissimum est, atque experientia comprobatum, leves gustus in philosophia movere fortasse ad atheismum, sed pleniores haustus ad religionem reducere.[4] Namque in limine philosophiæ, cum secundæ causæ tanquam sensibus proximæ ingerant se menti humanæ, mensque ipsa in illis hæreat atque commoretur, oblivio primæ causæ obrepere possit; sin quis ulterius pergat, causarumque dependentiam, seriem, et concatenationem, atque opera Providentiæ intueatur, tunc secundum

[1] αὐγὴ ξηρὴ ψυχὴ σοφωτάτη κατὰ τὸν Ἡράκλειτον ἔοικεν.— Plutarch "De Esu Carnium," 1. Plutarch alludes to the gnome in his tract *De Audiendis Poetis*, in a passage not unlike the text.

[2] Philo Judæus: "Quod somnia mittantur a Deo."

[3] Job, xiii. 7.

[4] This thought occurs several times in Bacon's writings. Leibnitz, with the large spirit of whose philosophy it is altogether in accordance, has quoted it at least thrice; thus for instance in his *Confessio Naturæ contra Atheistas*, he remarks: "Divini ingenii vir Franciscus Baconus de Verulamio recte dixit philosophiam obiter libatam a Deo abducere, penitus haustam reducere ad eundem."

poetarum mythologiam facile credet summum naturalis catenæ annulum pedi solii Jovis affigi.[1] Ut semel dicam, nemo male applicatæ sobrietatis moderationisque famam captans posse nos nimium progredi in libris sive scripturarum sive creaturarum, theologia aut philosophia, existimet: quinimo excitent se homines, et infinitos profectus audacter urgeant utrobique et persequantur; caventes tantum ne scientia utantur ad tumorem, non ad charitatem; ad ostentationem, non ad usum; et rursus, ne distinctas illas theologiæ philosophiæque doctrinas, earumque latices, imperite misceant ac confundant.

Accedamus nunc ad opprobria quibus literas aspergunt politici. Illa ejusmodi sunt: Artes emollire animos, militariquē gloriæ ineptos reddere; tum in politicis quoque corrumpere ingenia, quæ vel nimis curiosa efficiunt ex varietate lectionis, vel nimis pertinacia ex rigore regularum, vel nimis tumida ex magnitudine exemplorum, vel nimis extravagantia ex dissimilitudine exemplorum; quin saltem utcunque avertere et alienare animos a negotiis et actione, otii ac secessus amorem instillantes; dein rebuspublicis inducere disciplinæ relaxationem, dum unusquisque promptior est ad disputandum quam ad obtemperandum. Unde Cato Censorius, cum primis mortalium sapiens, ubi juventus Romana ad Carneadem philosophum, qui venerat Romam legatus, dulcedine atque majestate eloquentiæ ejus capta undique conflueret, frequenti senatu author fuit ut expeditis negotiis primo quoque tempore dimitterent hominem; ne civium animos inficeret et fascinaret, et necopinantibus morum consuetudinumque patriarum mutationem induceret.[2] Hoc etiam permovit Virgilium (dum studia sua patriæ existimationi posthaberet) ut artes politicas a literariis segregaret, illas Romanis vendicans, has Græcis relinquens, in versibus illis decantatis,

> Tu regere imperio populos, Romane, memento:
> Hæ tibi erunt artes.[3]

Videmus etiam Anytum Socratis accusatorem pro crimine ei objecisse, quod vi et varietate sermonum ac disputationum suarum authoritatem et reverentiam legum consuetudinumque patriarum apud adolescentes imminueret; quodque artem profiteretur perniciosam et periculo plenam, qua quis instructus

[1] Bacon alludes to the philosophical applications which have been made of the passage in the Iliad (Θ. 19.), in which Zeus boasts of his superiority to the other gods. Of these the earliest instance is to be found in the *Theætetus*.

[2] See Plutarch in Cato, c. 22.

[3] Æneid, vi. 852.

deteriorem causam meliorem faceret, veritatemque ipsam eloquentiæ apparatu obrueret.[1]

Verum hæ criminationes, ceteræque ejusdem farinæ, potius personatam gravitatem præ se ferunt quam veritatis candorem. Testatur enim experientia, sicut unos atque eosdem homines, sic una eademque tempora, et rerum bellicarum et optimarum artium gloria floruisse. Viros quod attinet, exemplo sit nobile par imperatorum, Alexander Magnus et Julius Cæsar Dictator, alter Aristotelis in philosophia discipulus, alter Ciceronis in dicendo rivalis. Aut si quis requirat potius literatos qui in claros imperatores evaserunt quam imperatores qui insigniter docti fuerunt, præsto est Epaminondas Thebanus, aut Xenophon Atheniensis; quorum ille primus fuit qui fregit potentiam Spartanorum, hic autem primus qui stravit viam ad eversionem monarchiæ Persarum. Istud vero armorum literarumque quasi conjugium clarius adhuc in temporibus quam in personis elucescit, quanto nimirum sæculum homine objectum grandius est. Ipsa quippe eademque tempora apud Ægyptios, Assyrios, Persas, Græcos, Romanosque, quæ propter bellicam virtutem maxime celebrantur, etiam et literis plurimum fuerunt nobilitata; adeo ut gravissimi authores philosophique, et clarissimi duces atque imperatores, eodem sæculo vixerint. Nec sane aliter fieri potest, quandoquidem ut in homine vigor corporis animique simul fere maturescunt, nisi quod ille hunc paulo antevertat; sic in rebuspublicis, militaris gloria literataque (quarum illa corpori respondet, hæc animo) aut coeva sunt, aut se proxime consequuntur.

Jam vero, eruditionem politicis impedimento esse potius quam adjumento, nil minus probabile. Fatemur omnes temerarium quiddam esse empiricis medicis corpus et valetudinis curam tradere, qui solent pauca quædam medicamenta quæ illis videntur panchresta venditare, quorum fiducia nihil non audent tentare; cum tamen neque causas morborum, neque ægrotorum habitus, neque symptomatum pericula, neque veram sanandi methodum calleant. Videmus pariter errare eos, qui ad causas et lites suas expediendas adhibent leguleios in practica potius quam in libris juris versatos, quibus os facile oblinitur, si quid novum aut extra experientiæ suæ calles tritos occurrat: consimiliter non potest non esse periculosissimum, quoties summa rerum empiricis consiliariis præcipue mandatur. E contra, vix

[1] Apologia Socratis, p. 23. et seq.

exemplum adduci possit reipublicæ infœliciter administratæ, ad clavum sedentibus viris eruditis. Quamvis enim in more sit politicis literatos Pedantiorum nomine elevare, Historia tamen *veritatis magistra* in plurimis fidem facit, pupillares principes adultis longe præstitisse (non obstante ætatis incommodo) ea ipsa de causa quam politici sugillant, quod scilicet tunc temporis a pædagogis administratum sit imperium. Quis ignorat per decantatum illud quinquennium Neronis onus rerum incubuisse Senecæ pædagogo? Quin et Gordianus Junior decennium laudis Misitheo pædagogo debuit. Neque infœlicius imperium gessit Alexander Severus dum minor fuit, quo tempore omnia procurabant mulieres, sed ex consilio præceptorum. Imo, convertamus oculos ad regimen Pontificium, ac nominatim Pii Quinti vel Sixti Quinti nostro sæculo, qui sub initiis suis habiti sunt pro fraterculis rerum imperitis[1]; reperiemusque acta paparum ejus generis magis esse solere memorabilia quam orum qui in negotiis civilibus et principum aulis enutriti ad papatum ascenderint. Quamvis enim qui in literis vitam maxime traduxerunt minus sollertes sint atque versatiles in occasionibus prensandis atque accommodandis rebus, quo spectant ea quæ ab Italis *Ragioni di Stato* dicuntur (quorum nomen ipsum aversatus est Pius Quintus, solitus dicere *Esse mera malorum hominum commenta, quæ opponerentur religioni et virtutibus moralibus*[2]: in eo tamen abunde fit compensatio, quod per tutum planumque iter religionis, justitiæ, honestatis, virtutumque moralium, prompte atque expedite incedant; quam viam qui constanter tenuerint, illis alteris remediis non magis indigebunt quam corpus sanum medicina. Porro autem curriculum vitæ in uno homine suppeditare non potest exemplorum copiam ad regendos eventus vitæ, etiam in uno homine. Sicut enim interdum fit, ut nepos vel pronepos avum vel proavum magis referat quam patrem; eodem modo haud raro evenit, ut negotia præsentia magis quadrent cum exemplis vetustioribus quam cum recentioribus. Postremo, unius ingenium tantum cedit amplitudini literarum, quantum privati reditus ærario.

[1] The former of these Popes was a Dominican, the latter a Franciscan friar. The most remarkable event of the Pontificate of Pius V. was the battle of Lepanto in 1571, in which his fleet was engaged in conjunction with those of Venice and of Spain. Sixtus V. was the founder of the Vatican library. Compare Gibbon's phrase: "The genius of Sixtus the Fifth burst from the gloom of a Franciscan cloister."—*Decline and Fall*, c. 76.

[2] See his life by Catena.

Quod si detur, depravationes illas et impedimenta quæ a politicis imputantur literis aliquid virium habere et veritatis, attamen simul monendum, eruditionem in singulis plus remedii quam mali afferre. Esto enim, literæ tacita quadam vi animum reddunt incertum atque perplexum; at certe liquido præcipiunt quomodo cogitationes sint expediendæ, et quousque sit deliberandum, quando demum statuendum; imo ostendunt quomodo res interim absque periculo trahi possint et suspendi. Esto etiam, animos efficiunt magis pertinaces et difficiles; at simul docent quæ res demonstrationibus, quæ conjecturis innituntur; neque minus distinctionum et exceptionum usum quam canonum et principiorum constantiam proponunt. Esto rursus, seducunt et detorquent animos exemplorum vel imparitate vel dissimilitudine; nescio; sed satis novi eas tam circumstantiarum efficacias quam comparationum errores et applicationum cautiones explicare; adeo ut in universum magis corrigant animos quam corrumpant. Hæc autem remedia insinuant undequaque literæ, magna vi et varietate exemplorum. Perpendat quis errores Clementis Septimi, a Guicciardino, qui ei fuit quasi domesticus, tam luculenter depictos[1]; aut vacillationes Ciceronis, in Epistolis ad Atticum manu propria ad vivum resectas[2]; omnino inconstantiam et crebras conciliorum mutationes vitabit. Inspiciat errores Phocionis, pervicaciam exhorrebit. Fabulam Ixionis legat, et nimias spes et hujusmodi fumos ac nebulas dispellet. Intueatur Catonem Secundum, neque unquam migrabit ad Antipodas et contraria præsenti sæculo vestigia figet.

Jam qui putant literas desidiæ amicas esse otiique et secessus dulcedine perfundere animum, mirum præstabunt, si quæ assuefaciunt mentem perpetuæ agitationi, socordiæ patronas ostendant; cum contra vere affirmari possit, inter omnia hominum genera nullum negotia amare propter ipsa negotia, præter literatum. Alii enim res et negotia diligunt quæstus gratia, ut conductitii opus propter mercedem. Alii honoris ergo; etenim dum res gerunt, vivunt in oculis hominum,

[1] Guicciardini's character of Clement VII. will be found in the sixteenth book of his history, ch. 5. I transcribe the part which relates to the "inconstantia" of which Bacon speaks. "E nel deliberarsi e nell' eseguire quel che pure avesse deliberato, ogni piccolo rispetto che di nuovo se gli scoprisse, ogni leggiere impedimento che se gli attraversasse, pareva bastante a farlo ritornare in quella confusione nella quale ero stato innanzi deliberasse," &c.

[2] The seventh letter of the sixteenth book may be particularly referred to in illustration of the remark in the text.

existimationique suæ inserviunt alioqui evanituræ. Alii propter potentiam et fortunæ prærogativam, ut amicos remunerare, inimicos ulcisci possint. Alii ut facultatem aliquam suam quam adamant exerceant, ac sibi ipsis hoc nomine sæpius gratulentur et arrideant. Alii denique, ut alios suos fines consequantur. Adeo ut quod de gloriosis dici solet, eorum fortitudinem sitam esse in spectantium oculis, sic hujusmodi hominum diligentia et strenuitas hoc videtur agere, aut ut alii plaudant aut ut ipsi intra se gestiant. Soli literati negotiis et occupationibus delectantur, tanquam actionibus naturæ consentaneis, et non minus salubribus animo quam exercitatio est corpori, ipsam rem non emolumentum intuentes; ita ut omnium minime sint defatigabiles, si modo res sit hujusmodi ut animum pro dignitate ejus impleat et detineat. Quod si reperiantur interdum nonnulli in legendo strenui, in agendo cessatores; non hoc a literis ortum habet, sed ab imbecillitate et mollicie quadam corporis animive; quales notat Seneca, *Quidam*, inquit, *tam sunt umbratiles, ut putent in turbido esse quicquid in luce est.*[1] Usuvenire poterit fortasse, ut hujusmodi ingenii sibi conscii se dent literis; eruditio autem ipsa hujusmodi ingenia minime indit aut progignit. Quod si quis illud nihilominus mordicus teneat, literas nimium absumere temporis, quod alias rectius impendi possit; aio, neminem adeo distringi negotiis, quin habeat sua otii intervalla, donec agendi vices atque æstus refluant, nisi aut admodum hebes sit in expediendis negotiis, aut parum cum dignitate ambitiosus in negotiis cujuscunque generis captandis. Restat igitur quærendum, qua in re et quomodo has subsecivas horas collocare oporteat; studiis an voluptatibus, genio an ingenio, indulgendum? Sicut recte respondit Demosthenes Æschini, homini voluptatibus dedito, qui cum per contumeliam objecisset *Orationes ejus lucernam olere; Pol*, inquit, *multum interest inter ea quæ ego ac tu ad lucernam facimus.*[2] Quare neutiquam metuendum ne literæ eliminent negotia; quin potius vindicant animum ab otio et voluptate, quæ alias sensim ad utriusque damnum, et negotiorum et literarum, subintrare solent.

Dein, quod oggerunt, literas reverentiam legum atque im-

[1] "Quidam adeo in latebras refugerunt ut putent in turbido esse quicquid in luce est." — *Seneca*, Ep. 3. It is perhaps worthy of remark that Bacon's inaccurate quotation is adopted at second hand in the *Tatler*.

[2] Plutarch in Demosth. [According to Plutarch it was Pytheas who made the taunt. — *J. S.*]

perii convellere; calumnia mera est, nec probabiliter ad criminandum inducta. Nam qui *cœcam obedientiam* fortius obligare contenderit quam *officium oculatum* una opera asserat cœcum manu ductum certius incedere quam qui luce et oculis utitur. Imo citra omnem controversiam artes emolliunt mores, teneros reddunt, sequaces, cereos, et ad mandata imperii ductiles; ignorantia contra, contumaces, refractarios, seditiosos: quod ex historia clarissime patet, quandoquidem tempora maxime indocta, inculta, barbara, tumultibus, seditionibus, mutationibusque maxime obnoxia fuerint.

De Catonis Censoris judicio hoc dictum esto, meritissimas eum blasphemiæ in literas luisse pœnas, cum septuagenario major quasi repuerascens Græcam linguam cupidissime addisceret[1]; ex quo liquet, priorem illam censuram Græcæ literaturæ ex affectata potius gravitate quam quod ita penitus sentiret fluxisse. Ad Virgilii vero carmina quod attinet, utcunque illi libitum fuerit universo mundo insultare, Romanis asserendo artes imperandi, cæteras tanquam populares aliis relinquendo; in hoc tamen manifesto tenetur, Romanos nunquam imperii fastigium conscendisse, donec ad artium culmen simul pervenissent. Namque duobus primis Cæsaribus, viris imperandi peritissimis, contemporanei erant optimus poeta ille ipse Virgilius Maro, optimus historicus Titus Livius, optimus antiquarius Marcus Varro, optimus aut optimo proximus orator Marcus Cicero; principes certe, ex omni memoria, in sua quique facultate. Postremo, quantum ad Socratis accusationem, id dico tantum; recordemur temporum, quibus intentata est; nimirum sub Triginta Tyrannis, mortalium omnium crudelissimis, sceleratissimis, imperioque indignissimis; qui rerum et temporum orbis postquam circumactus esset, Socrates ille (flagitiosus scilicet) heroïbus annumeratus est, et memoria ejus omnibus tam divinis quam humanis honoribus cumulata; quin disputationes ejus, tanquam corruptrices morum prius habitæ, pro præsentissimis mentis morumque antidotis ab omni posteritate celebrantur. Atque hæc sufficiant ad respondendum politicis, qui superciliosa severitate aut fucata gravitate ausi sunt literas incessere contumeliis; quæ tamen confutatio impræsentiarum, nisi quod nesciamus an ad posteros permanaturi sint labores nostri, minus necessaria videatur; cum aspectus et favor duorum literatissimorum principum, Elizabethæ reginæ et

[1] V. Cicero Ac. Quæst. ii. c. 2.

Majestatis tuæ, tanquam Castoris et Pollucis, *lucidorum syderum*[1], tantum apud nos in Britannia literis amorem reverentiamque conciliaverint.

Nunc ad tertium vituperationum genus pervenimus, quod a literatis ipsis in literas redundat, altiusque cæteris solet hærere. Eæ vel a fortuna, vel a moribus, vel a studiis ipsorum originem ducunt. Quarum prima extra potestatem ipsorum est, secunda extra rem, ut tertia sola proprie in disquisitionem venire videatur. Quia tamen non tam de vero rerum pondere quam de vulgi æstimatione sermo instituendus est, haud abs re fuerit etiam de alteris duabus pauca quædam innuere.

Quapropter dignitatis imminutiones et quasi dehonestamenta, quæ a literatorum fortuna literis imponuntur, sumuntur aut a paupertate et inopia ipsorum, aut a vitæ genere obscuro et umbratili, aut ab occupationum in quibus versantur subjecto non admodum nobili.

Quantum ad paupertatem pertinet, quodque frequenter usuveniat ut literati inopes sint, et tenui plerumque origine, neque tam propere ditescant ac alii qui quæstui solum inhiant; consultum foret hunc locum, de laude paupertatis, Fratribus Mendicantibus (pace eorum dixerim) exornandum tradere; quibus Machiavellus non parum tribuebat, cum diceret, *jamdudum actum esset de regno sacerdotum, nisi reverentia erga fratres ac monachos episcoporum luxum et excessum compensasset.*[2] Pariter dicat quis, fœlicitatem et magnificentiam principum et nobilium jam olim recidere potuisse in barbariem et sordes, nisi deberent literatis istis pauperibus civilis vitæ culturam et decus. Sed missis his laudum aucupiis, notatu dignum est quam sacra atque veneranda res, per aliquot apud Romanos secula, paupertas ipsa habita fuerit; quæ tamen respublica nihil trahebat ex paradoxis. Sic enim præfatur T. Livius: *Aut me amor negotii suscepti fallit, aut nulla unquam respublica nec major nec sanctior nec bonis exemplis ditior fuit, nec in quam tam seræ avaritia luxuriaque immigraverint, nec ubi tantus ac tam diu paupertati ac parcimoniæ honos fuerit.*[3] Quinetiam postquam Roma jam degenerasset, legimus, cum Cæsar Dictator collapsam rempublicam instauraturum se profiteretur, quendam ex amicis ejus

[1] Hor. Car. i. 3. 2.

[2] See his Discorsi, iii. c. 1. The passage in the text is one of those to which Mersenne takes exception. It savours in his opinion of a wish to depreciate the hierarchy. See his *La Vérité des Sciences.*

[3] In præfatione.

prompsisse sententiam, nihil tam expeditum esse ad id quod ageret, quam si divitiarum honos quoquo modo tolleretur. *Verum* (inquit) *hæc et omnia mala pariter cum honore pecuniæ desinent, si neque magistratus neque alia vulgo cupienda venalia erunt.*[1] Denique, quemadmodum vere dictum est *ruborem esse colorem virtutis*[2], licet quandoque oriatur ex culpa; ita recte statuas paupertatem esse virtutis fortunam, quamvis interdum a luxu et incuria accersatur. Salomonis certe hæc est sententia, *Qui festinat ad divitias, non erit insons*[3]; et præceptum, *Veritatem eme et noli vendere, similiter scientiam et prudentiam*[4]: quasi æquum judicet, opes impendendas ut doctrina paretur, non doctrinam eo vertendam ut opes congerantur.

Quid attinet dicere de vita illa privata et obscura, quam literatis objiciunt? Adeo tritum thema est atque ab omnibus jactatum, otium et secessum (modo absint desidia et luxus) præponere vitæ forensi et occupatæ, propter securitatem, libertatem, dulcedinem, dignitatem, aut saltem ab indignitatibus immunitatem, ut nemo tractet hunc locum quin bene tractet: ita humanis conceptibus in exprimendo et consensibus in approbando consonat. Hoc tantum adjiciam, eruditos latentes in rebuspublicis, et sub oculis hominum minime degentes, similes esse imaginibus Cassii et Bruti, de quibus in elatione Juniæ non gestatis, cum aliæ plurimæ ducerentur, Tacitus, *Eo ipso* (inquit) *præfulgebant, quod non visebantur.*[5]

De occupationum quæ literatis committuntur vilitate illud occurrit, quod demandetur iisdem puerorum ac juniorum institutio, cujus ætatis contemptus in magistros ipsos redundat. Cæterum quam injusta sit hæc obtrectatio, si non ex vulgi opinione sed ex sano judicio res perpendatur, inde licet æstimare, quod diligentiores sint omnes in imbuenda testa recenti quam veteri; magisque solliciti sint qualem admoveant terram teneræ plantæ quam adultæ; unde liquet, præcipuam curam circa rerum et corporum initia versari. Rabbinis, si placet, porrige aurem; *Juvenes vestri visiones videbunt, et senes somniabunt somnia*[6]; ex hoc textu colligunt,

[1] Oratio prima ad C. Cæsarem de republicâ ordinandâ. This discourse and that which follows it have been ascribed to Sallust, but apparently without sufficient reason.

[2] See Diogen. Laert. in Diog. c. 54.

[3] Proverbs, xxviii. 20.

[4] Proverbs, xxiii. 23.

[5] "Sed præfulgebant Cassius atque Brutus, eo ipso quod effigies eorum non visebantur."—*Ann.* iii. sub calcem.

[6] Joel, ii. 28. "Notanda autem hic orationis concinnitas, et poetæ in jungendis

juventutem esse ætatem digniorem; quanto nimirum revelatio accedat clarior per visiones quam per somnia. Illud vero notatu omnino dignum, quod licet pædagogi, velut simiæ tyrannidis, scenæ sint ludibria, et temporum incuria in delectu ipsorum veluti obdormierit; vetus tamen querela sit, inde usque ab optimis et prudentissimis sæculis deducta, respublicas circa leges quidem nimium satagere, circa educationem indiligentes esse. Quæ nobilissima pars priscæ disciplinæ revocata est aliquatenus quasi postliminio in Jesuitarum collegiis; quorum cum intueor industriam solertiamque tam in doctrina excolenda quam in moribus informandis, illud occurrit Agesilai de Pharnabazo, *Talis cum sis, utinam noster esses.*[1] Atque hactenus de opprobriis e literatorum fortuna et conditione desumptis.

Quod ad literatorum mores; res est ista potius ad personas quam ad studia spectans. Reperiuntur proculdubio inter eos, quemadmodum in omnibus vitæ ordinibus et generibus, tam mali quam boni; neque propterea non verum est (quod asseritur) *abire studia in mores*[2]; atque literas, nisi incidant in ingenia admodum depravata, corrigere prorsus naturam et mutare in melius.

Veruntamen diligenter mihi atque ingenue rem æstimanti nullum occurrit dedecus literis ex literatorum moribus, quatenus sunt literati, adhærens; nisi forte hoc vitio vertatur (cujus Demosthenes, Cicero, Cato Secundus, Seneca, pluresque alii insimulantur) quod cum plerumque tempora de quibus legunt illis in quibus vivunt, et quæ præcipiuntur illis quæ aguntur, meliora sint, ultra quam par est contendant morum corruptelas ad præceptorum et dogmatum honestatem retrahere, et priscæ severitatis mores temporibus dissolutis imponere; de quo tamen abunde e propriis fontibus admoneri possunt. Solon enim interrogatus, an optimas civibus suis dedisset leges? *Optimas*, inquit, *ex illis quas ipsi voluissent accipere.*[3] Ita Plato, videns corruptiores suorum civium mores quam ut ipse ferre posset, ab omni publico munere abstinuit, dicens; *Sic cum patria agendum*

verbis delectus, quod senibus somnia tribuat, quæ debiliori ætati magis conveniunt, juvenibus visiones utpote vividioribus ingeniis ad concipienda phantasmata promptioribus."— *Tychsen*, quoted in Rosenmüller's *Schol. in Vet. Test.* ad loc.

[1] Plutarch in Agesil, c. 12. This commendation did not escape the diligence of Gomez, who, in his *Elogia Societatis Jesu* (Antwerp, 1667), has quoted it in the section of his work in which he brings forward the testimonies which have been borne by heretics to the merits of the society. V. p. 448.

[2] "Sive abeunt studia in mores."— *Ov. Epist.* xv. 83.

[3] Plutarch in Solone, c. 15.

esse, ut cum parentibus; hoc est, suasu, non violentia; obtestando, non contestando.[1] Atque hoc ipsum cavet ille, qui a consiliis Cæsari; *Non*, inquit, *ad vetera instituta revocans, quæ jampridem corruptis moribus ludibrio sunt.*[2] Cicero etiam hujus erroris arguit Catonem secundum, Attico suo scribens; *Cato optime sentit, sed nocet interdum reipublicæ: loquitur enim tanquam in republica Platonis, non tanquam in fæce Romuli.*[3] Idem Cicero molli interpretatione excusat philosophorum dicta et decreta duriora: *Isti*, inquit, *ipsi præceptores et magistri videntur fines officiorum paulo longius quam natura vellet protulisse, ut cum ad ultimum animo contendissemus, ibi tamen ubi oportet consisteremus.*[4] Ipsemet tamen potuit dicere, *Monitis sum minor ipse meis*[5]: quippe qui in eundem lapidem ipse, licet non tam graviter, impegerit.

Aliud quod eruditis non immerito fortasse objicitur vitium hujusmodi est, quod honori aut emolumento patriarum suarum aut dominorum proprias fortunas aut præsidia postposuerint. Sic enim Demosthenes Atheniensibus suis, *Mea*, inquit, *consilia, si recte attendatis, non sunt ejus generis per quæ ego inter vos magnus, vos inter Græcos despectui sitis; sed talia, ut mihi sæpenumero ea haud tutum sit dare, vobis autem semper utile amplecti.*[6] Haud aliter Seneca, postquam quinquennium illud Neronis æternæ eruditorum magistrorum consecrasset gloriæ, dominum suum omnibus jam flagitiis inquinatissimum libere atque fidenter monere non destitit, magno suo periculo, ac postremo præcipitio. Neque aliter potest se habere res; siquidem humanam mentem doctrina imbuit vero sensu fragilitatis suæ, instabilitatis fortunæ, dignitatis animæ et muneris sui; quarum rerum memores nullo modo sibi persuadere possunt fortunæ propriæ amplitudinem, tanquam præcipuum sibi bonorum finem, statui posse. Quare sic vivunt tanquam rationem reddituri Deo, et dominis post Deum, sive regibus sive rebuspublicis, hac formula, *Ecce tibi lucrefeci*[7], non autem illa, *Ecce mihi lucrefeci.* At politicorum turba, quorum mentes in

[1] Platonis Epistoll. 6. But Bacon probably took the story from Cicero, *Ad Familiares*, i. 9.

[2] Oratio prima de republ. ordinand.

[3] "Cato optimo animo utens et summâ fide, nocet interdum reipublicæ. Dicit enim tanquam in Platonis πολιτείᾳ, non tanquam in fæce Romuli, sententiam." — *Ad Attic.* ii. 1. 8.

[4] Pro Murænâ, c. 31. But Bacon's quotation is not quite accurate. ["Etenim isti ipsi mihi videntur vestri præceptores et virtutis magistri fines officiorum," &c. The rest as in the text. — *J. S.*]

[5] Ovid, *Ars Amat.* ii. 548. [6] De Chersoneso. [7] S. Matthew, xxv. 20.

doctrina officiorum et in contemplatione boni universalis non sunt institutæ et confirmatæ, omnia ad se referunt; gerentes se pro centro mundi, ac si omnes lineæ in se suisque fortunis debeant concurrere; de reipublicæ navi, licet tempestatibus jactata, neutiquam solliciti, modo ipsis in scapha rerum suarum receptus detur et effugium. At contra, qui officiorum pondera et philautiæ limites didicerunt, munia sua stationesque, licet cum periculo, tuentur. Quod si forte incolumes permaneant in seditionibus et rerum mutationibus, non id artibus aut versatili ingenio, sed reverentiæ quam probitas etiam ab hostibus extorquet, tribuendum. Cæterum quod attinet ad fidei constantiam et officiorum religionem, quas certe animis hominum inserit eruditio, utcunque eæ quandoque a fortuna mulctentur, aut ex male-sanis politicorum principiis condemnentur, tamen palam scilicet apud omnes laudem referent, ut in hac re longa defensione non sit opus.

Aliud vitium literatis familiare (quod facilius excusari potest quam negari) illud[1]: nimirum, quod non facile se applicent et accommodent erga personas quibuscum negotiantur aut vivunt: qui defectus e duabus oritur causis. Prima est, animi ipsius magnitudo, propter quam ægre se demittere possunt ad observantiam unius alicujus hominis. Amantis verba sunt, non sapientis, *satis magnum alter alteri theatrum sumus.*[2] Neque tamen inficias ibo, illum qui aciem animi, instar oculi, non possit æque contrahere ac dilatare insigni facultate ad res gerendas esse orbatum. Secunda vero causa est probitas morum et simplicitas; quæ tamen delectum judicii, non defectum, in illis arguit. Veri enim et legitimi observantiæ erga aliquam personam limites non ultra porrigunt se quam ita nosse illius mores ut absque offensione cum eo versari, eumque consilio si opus sit juvare, nobisque interim ipsis in omnibus cavere possimus; verum alienos affectus rimari, eo fine ut illum inflectas, verses, et ad libitum circumagas, hominis est parum candidi, sed potius astuti et bifidi; id quod in amicitia vitiosum fuerit, erga principes etiam inofficiosum. Mos enim Orientis, quo nefas habetur oculos in reges defigere, ritu quidem barbarus est, sed significatione bonus[3]; neque enim subditos decet corda

[1] I have inserted the colon after *illud*, there being no stop in the original. Possibly an *est* has dropped out. The corresponding passage in the *Advancement of Learning* stands thus,—"Another fault . . . . . is, that they fail," &c. — *J. S.*

[2] This sentiment is ascribed to Epicurus by Seneca, Ep. vii.

[3] Bacon probably refers to the relation of some modern traveller. Even in Hero-

regum suorum, quæ Sacræ Scripturæ inscrutabilia docent, curiosius rimari.

Superest etiamnum aliud vitium (quocum hanc partem concludam) literatis sæpius imputatum; videlicet quod in rebus exiguis et externis (vultu, gestu, incessu, sermonibus quotidianis, et hujusmodi) deficiant in observando decoro; unde homines imperiti ex istis minutis leviculisque erroribus quanti sint in rebus majoribus tractandis conjecturam capiunt. Verum fallit eos plerumque hujusmodi judicium; imo sciant responsum sibi esse a Themistocle, qui cum rogatus esset ut fidibus caneret, arroganter satis ipse de se sed ad præsens institutum perquam apposite respondit; *Se quidem fidium rudem esse, sed quo pacto oppidum parvum in civitatem magnam evadere posset satis nosse.*"[2] Et sunt proculdubio multi politicarum artium apprime gnari, quibus tamen in communi vita et quotidianis reculis nihil imperitius. Quinetiam hujusmodi sugillatores amandandi sunt ad Platonis elogium de præceptore suo Socrate, quem haud absimilem dixit pharmacopolarum pyxidibus, quæ exterius inducebantur simiis, ululis, satyrisque; intus vero pretiosos liquores et nobilia medicamenta recondita habebant: fatendo scilicet, quod ad vulgi captum et famam popularem præ se ferret nonnulla levia atque etiam deformia, cum tamen animi interiora summis tam facultatibus quam virtutibus essent repleta.[2] Atque de moribus literatorum hæc hactenus.

Interim monere placet, nos nihil minus agere quam ut patrocinemur quibusdam professorum institutis abjectis et sordidis, quibus et seipsos et literas dehonestarunt; quales erant apud Romanos, sæculis posterioribus, philosophi quidam in familiis divitum, mensarumque eorum asseclæ, quos haud absurde dicas *barbatos parasitos.* Cujus generis quendam lepide describit Lucianus, quem matrona nobilis catulum suum Melitæum in rheda gestare voluit; quod cum ille officiose sed indecenter faceret, pusio subsannans, *Vereor,* inquit, *ne philosophus noster*

dotus however we find a similar custom mentioned. He ascribes its introduction to Deioces. V. Herod. i. 99.

[1] Plut. in Them. 2.

[2] Bacon doubtless refers to the Symposium, p. 215. Yet of the passage in question he has scarcely given the import. Alcibiades likens Socrates not to the "pyxides pharmacopolarum," but to images of Sileni. Wats, it may be remarked, has in his version introduced the name of Alcibiades into the text without any authority for doing so. [Bacon was thinking no doubt of the free version of the passage, half comment half paraphrase, with which Rabelais opens his address to his readers. "Silenes estoyent jadiz petites boytes, telles que voyons de present es boutiques des apothecaires, painctes au dessus de figures joyeuses et frivoles," &c.—*J. S.*]

e Stoïco fiat Cynicus.[1] Ante omnia vero, nihil tam offecit literarum dignitati quam crassa et turpis adulatio, ad quam multi, neque hi indocti, et calamos et ingenia submisere, *Hecubam in Helenam, Faustinam in Lucretiam* (ut ait Du-Bartas) transformantes.[2] Neque vero nimis laudo morem illum receptum libros patronis nuncupandi; cum libri, præsertim qui hoc nomine dignandi, in veritatis tantum et rationis clientelam se dare debeant. Melius veteres, qui non aliis quam amicis atque æqualibus scripta sua dicare solebant, aut etiam nomina ejusmodi amicorum tractibus suis imponere; quod si forte regibus aut magnatibus opus nuncuparent, tum demum hoc factum est cum argumentum libri personæ tali conveniret. Hæc autem, et similia, reprehensionem potius merentur quam defensionem.

Neque hoc dico, quasi literatos culpem, si ad beatos et potentes viros quandoque se applicent; recte enim Diogenes[3] cuidam cum irrisione roganti, *Qui fieret quod philosophi divites sectarentur, non divites philosophos?* respondit, non sine morsu, *Hoc ideo fieri, quod philosophi quibus rebus indigeant probe intelligant, divites non item.* Huic affine est illud Aristippi, cui nescio quid petenti cum non attenderet Dionysius, ille adorantis more abjecit se ad pedes ejus, qui tum demum auscultans petitioni annuit; sed paulo post quidam dignitatis philosophiæ assertor increpuit Aristippum, quod demittendo se ad pedes tyranni pro tantilla re philosophiam ipsam contumelia affecisset; cui ille *suam id culpam non fuisse* respondit, *sed Dionysii, qui aures gestaret in pedibus.*[4] Quin prudens ille, non pusillanimis, habitus est, qui in disputatione quadam cum Hadriano Cæsare vinci se

[1] Lucian's De mercede conductis. It would more accord with the original to read *catellam suam Melitæum.*

[2] Tous ces doctes esprits dont la voix flatteresse,
Change Hécube en Hélène, et Faustine en Lucresse,
Qui d'un nain, d'un bâtard, d'un archerot sans yeux,
Font, non un dieutelet, ains le maistre des dieux, &c.
DU-BARTAS, *Second jour de la Semaine.*

Du-Bartas, Montaigne, and Rabelais are I think the only French writers whom Bacon quotes, though he perhaps alludes in one passage to the celebrated jurist D'Argentré and seems to have read Charron. Du-Bartas's writings were held in great esteem by King James. He is quoted in "The trew Law of free Monarchies" and in "A declaration against Vorstius," and is in both places termed the divine poet; a designation which perhaps refers merely to the nature of his subject. In the third book of the *Basilicon Doron* he is particularly recommended to Prince Henry's studies. Cardinal du Perron's criticism on Du-Bartas is amusing; that instead of calling the sun the King of Lights, he would prefer to call him the Duke of Candles.

[3] Not Diogenes, but Aristippus. See *Diog. Laert. in Aristip.* c. 69. Wats has without authority corrected this error in his translation.

[4] Diog. Laert. in Arist. c. 79.

passus est, excusans factum, *Quod æquum esset ei cedere qui triginta imperaret legionibus.*[1] Atque propterea non sunt damnandi viri docti, ubi cum res postulat aliquid de gravitate sua remittant, sive imperante necessitate sive impetrante occasione; quod quamvis humile videatur atque servile primo intuitu, tamen verius rem æstimanti, censebuntur non personæ sed tempori ipsi servire.

Pergamus nunc ad errores atque inania, quæ in studiis ipsis virorum doctorum interveniunt, iisque se immiscent; id quod præcipue et proprie spectat ad præsens argumentum. Qua in re, non est instituti nostri erroribus ipsis patrocinari, sed per eorum censuram et secretionem excutere quod sanum et solidum est, atque a calumnia vindicare. Videmus enim in more præsertim apud invidos esse, propter ea quæ depravata sunt, etiam ea quæ impolluta et in statu suo manserunt sugillare; quemadmodum ethnici in primitiva Ecclesia Christianos hæreticorum vitiis aspergere solebant. Neque tamen consilium est mihi examen aliquod accuratius instituere de erroribus et impedimentis literarum, quæ interiora et a captu vulgi remotiora; sed de illis tantum verba facere, quæ cadunt sub communi et populari observatione et nota, aut saltem ab ea non longe recedunt.

Quare tria præcipue deprehendo vana et inania in literis, quæ ansas præcipue præbuerunt ad obtrectandum. Eas enim res pro vanis ducimus, quæ aut falsæ sunt aut frivolæ; in quibus scilicet aut veritas deficit aut usus: illos etiam homines vanos et leves existimamus, qui aut ad falsa creduli aut in rebus exigui usus curiosi. Curiositas autem aut in rebus ipsis versatur aut in verbis; quando nimirum aut in rebus inanibus opera insumitur, aut circa verborum delicias nimium insudatur. Quocirca non certæ magis experientiæ quam rectæ etiam rationi consonum videtur, ut tres ponantur doctrinarum intemperies. Prima est doctrina fantastica, secunda doctrina litigiosa, tertia doctrina fucata et mollis; vel sic, vanæ imaginationes, vanæ altercationes, vanæ affectationes. Ac quidem ordiar ab ultima.

Intemperies ista, in luxurie quadam orationis sita, (licet olim per vices in pretio habita fuerit) circa Lutheri tempora miris modis invaluit. In causa præcipue fuit, quod fervor et efficacia concionum tunc temporis ad populum demulcendum et allicicendum maxime vigebat; illa autem populare genus orationis

[1] This story is told of Favorinus by Spartianus, in Hadriani vitâ.

poscebant. Accedebat odium et contemptus illis temporibus ortus erga scholasticos, qui stilo et scribendi genere utebantur valde diverso, verba licenter admodum cudentes nova et horrida, de orationis ornatu et elegantia parum solliciti, dummodo circuitionem evitarent et sensus ac conceptus suos acute exprimerent; atque hinc factum est, ut paulo postea major apud plurimos cœperit haberi verborum cura quam rerum; plerisque magis comptam phrasim, teretem periodum, clausularum rhythmos, troporum stellulas, quam pondus rerum, rationum nervos, inventionis acumen, aut judicii limam affectantibus. Tum demum floruit Osorii Lusitani[1] episcopi luxurians et diluta oratio. Tunc Sturmius[2] in Cicerone Oratore et Hermogene Rhetore infinitam et anxiam operam consumpsit. Tunc Carrus et Aschamus apud nos prælectionibus et scriptis suis Ciceronem et Demosthenem usque ad cœlum evehentes, juvenes ad politum hoc et florens doctrinæ genus invitarunt. Tunc Erasmus arripuit ansam introducendi ridiculam illam Echo, *Decem annos consumpsi in legendo Cicerone;* cui Echo respondit, *one*, asine.[3] Scholasticorum vero doctrina despectui prorsus haberi cœpit, tanquam aspera et barbara. Denique, ut semel dicam, præcipua illorum temporum inclinatio et studium potius ad copiam quam ad pondus deflexit.

Hic itaque cernere est primam literarum intemperiem, cum (ut diximus) verbis studetur non rebus; cujus etsi e citimis tantum temporibus protulerim exempla, tamen secundum majus et minus et olim placuerunt ejus generis ineptiæ, et deinceps placebunt. Jam vero fieri non potest, quin hoc ipsum multum faciat ad doctrinæ existimationem minuendam et elevandam, etiam apud vulgus imperitum; cum videant doctorum scripta tanquam primam literam diplomatis, quæ quamvis variis calami ductibus et flosculis variegata sit, litera tamen est unica. Ac mihi sane videtur perapposita hujusce vanitatis adumbratio et quasi emblema, Pygmalionis illa insania; quid enim aliud sunt

[1] Osorius, bishop of Sylves in Algarve, died in 1580. One of his principal works is his *De rebus gestis Emanuelis*, 1574, in twelve books. It contains an account of the Portuguese discoveries and conquests which took place in the reign of Emanuel the Great (1495—1521).

[2] John Sturmius, who has been styled the German Cicero, was born in 1507, and died in 1589. He was a professor at Paris and at Strasbourg, and has left, among other works, some notes on Hermogenes.

[3] "'Decem jam annos ætatem trivi in Cicerone.' Echo '*ὄνε.*'"—*Erasm. Colloq.* A little farther on Erasmus makes Ciceronianus suggest the echo *ἄνους*.

verba quam imagines rerum, ut nisi rationum vigore animata sint, adamare illa idem sit ac statuam deperire?

Neque tamen temere damnandum est, si quis philosophiæ obscura et aspera, verborum splendore illustret et expoliat. Hujus enim rei magna adsunt exempla in Xenophonte, Cicerone, Seneca, Plutarcho, ipsoque etiam Platone. Nec minor est utilitas. Quamvis enim diligentem veri cognitionem atque acre studium philosophiæ res hæc nonnihil impediat, quoniam præpropere mentem consopit, atque ulterioris disquisitionis sitim et ardorem restinguit; si quis tamen doctrinam ad usus civiles adhibeat (sermocinandi videlicet, consulendi, suadendi, argumentandi, et similium), omnia quæ cupiat præparata et adornata in hujusmodi authoribus reperiet. Veruntamen hujusce rei excessus adeo juste contemnitur, ut quemadmodum Hercules, cum videret in templo statuam Adonidis (Veneris deliciarum) indignabundus dixit, *Nil sacri es*[1]; ita omnes Herculei literarum pugiles, id est, laboriosi atque constantes indagatores veritatis, hujusmodi delicias et lauticias, tanquam nil divini spirantes, facile spreverint.

Paulo sanius est aliud styli genus (neque tamen ipsum omnino vanitatis expers), quod copiæ illi et luxuriæ orationis tempore fere succedit. Illud totum in eo est, ut verba sint aculeata, sententiæ concisæ, oratio denique potius versa quam fusa; quo fit, ut omnia per hujusmodi artificium magis ingeniosa videantur quam revera sint. Tale invenitur in Seneca effusius, in Tacito et Plinio Secundo moderatius; atque nostri temporis auribus cœpit esse non ita pridem accommodatum. Verum hoc ipsum mediocribus ingeniis gratum esse solet (adeo ut dignitatem quandam literis conciliet); attamen a judiciis magis limatis merito fastiditur, et poni possit pro intemperie quadam doctrinæ, cum sit verborum etiam et eorum concinnitatis aucupium quoddam. Atque hæc de prima literarum intemperie dicta sunt.

Sequitur ea intemperies in rebus ipsis, quam posuimus mediam, et *litigiosæ subtilitatis* nomine designavimus. Estque illa, de qua modo diximus, aliquanto deterior. Ut enim rerum dignitas verborum cultui præcellit; sic e contrario, odiosior est vanitas in rebus quam in verbis. Qua in re increpatio illa Paulina non magis ad suam ætatem referri, quam ad sequentia

[1] See the scholiast on Theocritus, v. 2. But Bacon probably took the story from the *Adagia* of Erasmus.

tempora deduci potest; neque theologiam tantum, sed etiam omnes scientias respicere videtur: *Devita profanas vocum novitates, et oppositiones falsi nominis scientiæ.*[1] His enim verbis, duo signa indiciaque scientiæ suspectæ atque ementitæ proponit. Primum est, vocum novitas et insolentia; alterum, rigor dogmatum; qui necessario oppositionem, et dein altercationes quæstionesque inducit. Certe quemadmodum complura corpora naturalia, dum valent integra, corrumpuntur sæpius et abeunt in vermes; eodem modo sana et solida rerum cognitio sæpenumero putrescit, et solvitur in subtiles, vanas, insalubres, et (si ita loqui licet) vermiculatas quæstiones; quæ motu quodam et vivacitate nonnulla præditæ videntur, sed putidæ sunt et nullius usus. Hoc genus doctrinæ minus sanæ, et seipsam corrumpentis, invaluit præcipue apud multos ex scholasticis, qui summo otio abundantes, atque ingenio acres, lectione autem impares (quippe quorum mentes conclusæ essent in paucorum authorum, præcipue Aristotelis dictatoris sui, scriptis, non minus quam corpora ipsorum in cœnobiorum cellis), historiam vero et naturæ et temporis maxima ex parte ignorantes, ex non magno materiæ stamine, sed maxima spiritus, quasi radii, agitatione, operosissimas illas telas quæ in libris eorum exstant confecerunt. Etenim mens humana, si agat in materiam (naturam rerum et opera Dei contemplando), pro modo materiæ operatur atque ab eadem determinatur; sin ipsa in se vertatur (tanquam aranea texens telam)[2], tum demum interminata est, et parit certe telas quasdam doctrinæ tenuitate fili operisque admirabiles, sed quoad usum frivolas et inanes.

Hæc inutilis subtilitas, sive curiositas, duplex est; et spectatur aut in materia ipsa, qualis est inanis speculatio sive con-

[1] 1 Tim. vi. 20.

[2] In Bacon's *Promus*, a manuscript collection of sentences, formulæ, &c. [for a particular account of which see the Literary Works], we find the following: "Ex se fingit velut araneus." Bacon had doubtless taken this from Erasmus, by whom it is given as a proverb. V. Erasm. *Adag.* iv. 4. 43. Erasmus again derived it from Plutarch, *De Osiride.* Plutarch applies the comparison to poets and orators. Neither in his use of it, nor in Erasmus's remarks, nor yet in our text, is there anything to countenance the interpretation which M. Cousin has given of Bacon's meaning, namely that he intended to throw discredit on the study of psychology. He seems to have been led to this interpretation by the word materiam, taking it as if in antithesis to soul or spirit; whereas it means nothing more than the object, τὸ προκειμένον, on which the mind works. Surely Bacon might have defended himself by saying that he had explained "materia" in the figurative sense in which he used it, as equivalent to "natura rerum et opera Dei," and by inquiring whether the object of psychological researches were not included among the works of God. In the *Novum Organum* we find more than one example of what M. Cousin would doubtless recognise as an attempt at experimental psychology.

troversia; cujus generis reperiuntur et in theologia, et in philosophia, haud paucæ; aut in modo et methodo tractandi. Hæc apud scholasticos fere talis erat: super unaquaque re proposita formabant objectiones, deinde objectionum illarum solutiones; quæ solutiones ut plurimum distinctiones tantum erant; cum tamen scientiarum omnium robur, instar fascis illius senis, non in singulis bacillis sed in omnibus vinculo conjunctis consistat. Etenim symmetria scientiæ, singulis scilicet partibus se invicem sustinentibus, est et esse debet vera atque expedita ratio refellendi objectiones minorum gentium. Contra, si singula axiomata tanquam baculos fascis seorsim extrahas, facile erit ea infirmare, et pro libito aut flectere aut frangere. Ut quod de Seneca dictum erat, *Verborum minutiis rerum frangit pondera*[1], vere de scholasticis usurpari possit, *Quæstionum minutiis scientiarum frangunt robur.* Numnon in aula spatiosa consultius foret unum accendere cereum, aut lychnuchum suspendere variis luminibus instructum, quo omnia simul perlustrentur, quam in singulos angulos quaquaversus exiguam circumferre lucernam? Atqui non absimilis est eorum ratio, qui non tam veritatem perspicuis argumentis, authoritatibus, comparationibus, exemplis illustrare nituntur; quam in hoc solum incumbunt ut minutos quosque scrupulos eximant, et captiunculas expediant, et dubitationes solvant; hoc pacto quæstionem ex quæstione gignentes, quemadmodum fit in superiori similitudine, ut lucerna in unum aliquem locum delata alios circumquaque destituat et obscuret. Adeo ut Scyllæ fabula ad vivum exprimat hoc genus philosophiæ; cujus os et pectus virginem formosam præferebant, infra vero fuisse aiunt

Candida succinctam latrantibus inguina monstris.[2]

Sic generalia quædam apud scholasticos invenias, quæ pulchra sunt dictu, et non perperam inventa; ubi autem ventum fuerit ad distinctiones decisionesque, pro fœcundo utero ad vitæ hu-

[1] "Si rerum pondera minutissimis sententiis non fregisset, consensu potius eruditorum quam puerorum amore comprobaretur."— *Quintil.* x. c. 1.

The method of the schoolmen is correctly described in the text. Generally each quæstio or inquiry begins with a statement of the different points which are to be elucidated. To each of these is allotted a separate articulus. One or more reasons are alleged in favour of the opinion which the author means to reject. Some objection, generally founded on a quotation from some conclusive authority, is then stated against it, and then the author gives his own opinion in what is called the *Conclusio*, and proceeds to refute one by one the arguments he has adduced on the other side. It is impossible not to recognise in this method of procedure the influence of a system of oral disputation.

[2] Æneid, vi. 75.

manæ commoda, in portentosas et latrantes quæstiones desinunt. Itaque minime mirum, si hoc genus doctrinæ etiam apud vulgus hominum contemptui obnoxium fuerit, qui fere solent veritatem propter controversias circa eam motas aspernari, atque existimare eos errare omnes qui nunquam inter se conveniant; cumque videant doctos homines inter se digladiari de rebus nullius momenti, facile illud Dionysii Syracusani arripiunt, *Verba ista sunt senum otiosorum.*[1] Nihilominus certissimum est, si modo scholastici ad inexplebilem sitim veritatis et continuam agitationem ingenii varietatem et multiplicitatem lectionis et contemplationum adjunxissent, insignia profecto illi exstitissent lumina, omnesque artes et scientias mirifice provexissent. Hactenus de secunda literarum intemperie.

Ad tertiam quod attinet, quæ ad falsitatem et mendacium spectat; una hæc omnium turpissima est, quippe quæ ipsam naturam animamque destruit scientiæ, quæ nihil aliud est quam veritatis imago. Nam veritas essendi et veritas cognoscendi idem sunt; nec plus a se invicem differunt, quam radius directus et reflexus.[2] Hoc vitium itaque duplex vel potius duplicatum est, impostura et credulitas; hæc decipitur, illa decipit; quæ licet videantur discrepantis naturæ, alteraque a calliditate quadam, altera a simplicitate profecta, plerumque tamen coëunt. Ut enim in carmine habetur,

Percontatorem fugito, nam garrulus idem est;[3]

innuendo, qui curiosus est eundem esse et futilem; pariter fit, ut qui facile credat idem libenter decipiat. Quemadmodum quoque fieri videmus in fama et rumoribus, ut qui cito iisdem fidem habeat, pari facilitate eos auxerit. Quod Tacitus pru-

[1] See Nov. Org. i. 71.

[2] We may illustrate this passage from the writings of S. Thomas Aquinas. "Res intellecta ad intellectum aliquem potest habere ordinem vel per se vel per accidens. Per se quidem habet ordinem ad intellectum a quo dependet secundum suum esse, per accidens autem ad intellectum a quo cognoscibilis est. . . . . Unde unaquæque res dicitur vera absolute secundum ordinem ad intellectum a quo dependet. . . . Res naturales dicuntur esse veræ secundum quod assequuntur similitudinem specierum quæ sunt in mente divina. . . . Sic ergo veritas principaliter est in intellectu, secundario vero in rebus secundum quod comparantur ad intellectum ut ad principium." Thus the veritas essendi is as it were the direct beam derived from the divine mind on outward things. S. Thomas goes on to recognise the truth of the opinion that "veritas intellectus nostri a re causatur;" and we thus see how the veritas cognoscendi may be spoken of as radius reflexus, returned to the mind from the outward object, which had derived its own essential truth from the source of all truth. The passages I have quoted occur in the *Summa Theologiæ* of S. Thomas, I. q. 16. a. 1.

[3] Hor. Ep. i. 18. 69.

denter innuit his verbis, *Fingunt simul creduntque*[1]; adeo finitimæ sunt voluntas fallendi et facilitas credendi.

Hæc credendi recipiendique omnia (licet levi authoritate munita) facilitas, duorum generum est, pro ratione subjectæ materiæ; aut enim creditur narrationi sive facto (ut loquuntur Jurisconsulti), aut dogmati. In priori genere videmus quanto dignitatis detrimento hic error affecerit ex Ecclesiasticis Historiis nonnullas; quæ nimis faciles se præbuerunt in prodendis transcribendisque miraculis, a Martyribus, Eremitis, Anachoretis, et aliis sanctis viris, atque ab eorum reliquiis, sepulchris, sacellis, imaginibus, editis. Eodem modo in naturali historia videmus multa temere ac parum cum delectu aut judicio recepta et descripta; ut liquet ex scriptis Plinii, Cardani, Alberti, et plurimorum ex Arabibus, quæ commentitiis et fabulosis narrationibus passim scatent; iisque non solum incertis et neutiquam probatis, sed perspicue falsis et manifesto convictis; ingenti philosophiæ naturalis dedecore, apud homines graves et sobrios. In quo sane elucescit Aristotelis sapientia et integritas, qui cum diligentem scripserit atque accuratam historiam Animalium, tam parce ficta aut fabulosa admiscuerit; quin potius *auditiones admirandas*, quas memoratu dignas judicavit, in unum commentariolum[2] conjecit; prudenter perpendens, perspicue vera (quæ, tanquam basis experientiæ solida, philosophiæ et scientiis substerni possint) haud temere esse cum rebus suspectæ fidei miscenda; et rursus etiam rara atque insolita, quæ plerisque incredibilia videntur, non omnino esse supprimenda, neque memoriæ posterorum deneganda.

At illa altera credulitas, quæ non historiæ aut narrationibus sed artibus et opinionibus tribuitur, duplex est; aut cum artibus ipsis, aut cum authoribus in arte, nimium credimus. Artes ipsæ, quæ plus habent ex phantasia et fide quam ex ratione et demonstrationibus, sunt præcipue tres; *Astrologia*, *Naturalis Magia*, et *Alchymia*; quarum tamen fines non sunt ignobiles. Profitetur enim Astrologia superiorum in inferiora influxum et dominatum recludere. Magia sibi proponit naturalem philosophiam a varietate speculationum ad magnitudinem operum

[1] *Annals*, v. 10.: where he says that upon the report of the approach of Drusus Germanicus, "alliciebantur ignari famâ nominis et promptis Græcorum animis ad nova et mira; quippe lapsum custodiâ pergere ad paternos exercitus, Ægyptum aut Syriam invasurum, fingebant simul credebantque." Compare also *Hist.* i. 51.: "Sed plurima ad fingendum credendumque materies in ipsis castris." — *J. S.*

[2] The *De Mirabilibus Auscultationibus*; which is however not Aristotle's.

revocare. Chymica in se suscipit partes rerum heterogeneas, quæ in corporibus naturalibus latent et implicantur, separare et extrahere; corporaque ipsa inquinata depurare, impedita liberare, immatura perficere. Sed viæ atque rationes quæ ducere putantur ad hos fines, tam in theoria illarum artium quam in praxi, erroris et nugarum plenæ sunt. Neque adeo traditio ipsarum ut plurimum candida est, sed artificiis et latebris munita. Chymicæ tamen hoc certe debetur, quod vere comparari possit agricolæ apud Æsopum, qui e vita exiturus dixit filiis, *Se illis vim magnam auri in vinea, nec satis meminisse quo loco, defossam reliquisse;* qui cum vineam diligenter ligonibus ubique invertissent, aurum quidem repererunt nullum; sed tamen vindemiam insequentis anni, propter fossionem circa radices vitium, tulerunt longe uberrimam. Sic strenui illi Chymistarum labores et molimina circa aurum conficiendum haud paucis nobilibus inventis et experimentis, tum ad reserandam naturam tum ad usus vitæ apprime idoneis, quasi facem accenderunt.

Illa autem credulitas, quæ certos scientiarum authores dictatoria quadam potestate munivit ut edicant[1], non senatoria ut consulant, ingens damnum scientiis intulit; tanquam præcipua causa, quæ tantopere illas afflixit et depressit, ut absque insigni aliquo augmento exangues jacerent. Hinc nempe factum est, ut in artibus mechanicis primi inventores pauca excogitaverint, tempus reliqua suppleverit et perfecerit; at in scientiis primi authores longissime penetraverint, tempus plurima detriverit et corruperit. Sic videmus Tormentariam, Nauticam, Typographicam, sub initiis imperfectas et propemodum informes fuisse et exercentibus onerosas, temporis vero progressu expolitas et accommodas. At contra philosophiæ et scientiæ Aristotelis, Platonis, Democriti, Hippocratis, Euclidis, Archimedis, in ipsis illis authoribus viguerunt, tractu temporis degenerarunt potius et non minimum splendoris amiserunt; cujus rei non est alia ratio, quam quod in artibus mechanicis ingenia multorum in unum coïerunt, in artibus et scientiis liberalibus ingenia multorum sub uno succubuerunt; quem tamen ipsum sæpenumero sequaces sui potius depravarunt quam illustrarunt. Ut enim aqua non ascendet altius quam caput fontis a quo

[1] Bacon is not to be understood as using the word edicere in its technical signification. The "jus edicendi" was by no means the privilege of a dictator. It belonged to consuls, prætors, ædiles, and other magistrates.

promanat, ita doctrina ab Aristotele deducta supra doctrinam Aristotelis nunquam assurget.[1] Ideoque etsi non displiceat regula, *Oportet discentem credere*[2]; huic tamen conjungendum est, *Oportet jam edoctum judicio suo uti.* Discipuli enim debent magistris temporariam solum fidem, judiciique suspensionem, donec penitus imbiberint artes; non autem plenam libertatis ejurationem, perpetuamque ingenii servitutem. Quare, ut absolvam hanc partem, hoc tantum adjiciam; magnis authoribus suus sic constet honos, ut authori authorum et veritatis parenti, Tempori, non derogetur.

Explicavimus tandem tres doctrinæ intemperies, sive morbos; præter quos nonnulli sunt, non tam morbi confirmati quam vitiosi humores; qui tamen non adeo occulti sunt aut latentes, quin in multorum sensum et reprehensionem incurrant, ideoque neutiquam prætermittendi.

Horum primus est immodicum studium duorum extremorum, Antiquitatis et Novitatis; qua in re Temporis filiæ male patrissant. Ut enim Tempus prolem devorat, sic hæc se invicem; dum Antiquitas novis invideat augmentis, et Novitas non sit contenta recentia adjicere, nisi vetera prorsus eliminet et rejiciat. Certe consilium Prophetæ vera in hac re norma est: *State super vias antiquas, et videte quænam sit via recta et bona, et ambulate in ea.*[3] Antiquitas eam meretur reverentiam, ut homines aliquamdiu gradum sistere et supra eam stare debeant, atque undequaque circumspicere quæ sit via optima; quum autem de via bene constiterit, tunc demum non restitandum, sed alacriter progrediendum. Sane, ut verum dicamus, *Antiquitas sæculi juventus mundi.*[4] Nostra profecto sunt antiqua tempora,

[1] Happy as this image is, it is perhaps less so than that of Descartes with reference to the same subject. He compares the servile followers of Aristotle to "le lierre qui ne tend point à monter plus haut que les arbres qui le soutiennent, et même souvent qui redescend après qu'il est parvenu jusques à leur faîte."—*De la Méthode*, i. 202. of Cousin's edition.

[2] Arist. De Sophist. Reprehens. ii.

[3] Jerem. vi. 16.

[4] This remark is not, I think, given by Bacon as a quotation, and it is probable that he did not derive it from any earlier writer. But in the works of several of the scientific reformers we find similar reflexions. Of writers earlier than Bacon or contemporary with him, we may refer to Gilbert, to Galileo, to the *Apologia pro Galileo* of Campanella, and particularly to the *Cena di Cenere* of Giordano Bruno. The following passage from the last-named writer, in which he appears to have anticipated Bacon, has been referred to by Dr. Whewell in the *Philosophy of the Inductive Sciences*. "Sia come la si vuole," says one of the interlocutors in Bruno's dialogue, "io non voglio discostar mi dal parer degli antichi, perche dice il saggio, Ne l'antiquità è la sapienza." To which another replies: "E soggiunge 'In molti anni la prudenza.' Se voi intendeste bene qualche dite, vedreste che dal vostro fondamento s'inferisce

cum mundus jam senuerit; non ea, quæ computantur ordine retrogrado initium sumendo a sæculo nostro.

Alius error e priori oriundus, est suspicio quædam et diffidentia, quæ nihil nunc posse inveniri autumat, quo mundus tam diu carere potuit; ac si illa objectio conveniret erga tempus, qua Lucianus impetit Jovem cæterosque ethnicorum deos. *Miratur enim, cur tot olim genuerint liberos, nullos autem suo sæculo? interrogatque jocans, ecquid septuagenarii jam essent, aut lege Papia contra senum nuptias lata constricti?* [1] Sic videntur homines subvereri, ne Tempus effœtum jam factum sit et ad generationem ineptum. Quin potius levitas hominum atque inconstantia hinc optime perspici potest, qui donec res aliqua perfecta sit, eam mirantur fieri posse; postquam facta semel est, iterum mirantur eam jampridem factam non fuisse. Ita Alexandri expeditio in Asiam habita est initio pro vasto et arduo admodum negotio; quam tamen postea placuit Livio in tantum elevare ut diceret de Alexandro, *Nil aliud quam bene ausus est vana contemnere.*[2] Idem Columbo evenit, circa occidentalem navigationem.[3] Sed in rebus intellectualibus hoc fit multo frequentius, uti videre est in plerisque propositionibus apud Euclidem, quæ antequam demonstrentur miræ videntur, et quibus quis non facile assenserit; post demonstrationem

il contrario di quel che pensate. Voglio dire che noi siamo più vecchi ed abbiamo più lunga età, che i nostri predecessori."— *Cena di Cenere*, i. p. 132. of Wagner's edition of G. Bruno.

The idea that the early ages were the world's youth is to be found in the second book of Esdras, or is at any rate directly suggested by an expression which occurs there: "Seculum perdidit juventutem suam, et tempora appropinquant senescere." — 2 *Esdras*, xiv. 10. The same idea occurs in Casmann's *Problemata Marina*, which was published in 1546. "Si . . . . . antiquiorum dignitas ex tempore major videtur, id nostros qui hodie docent posteriores unice commendabit, nam tempus . . . . . doctius et prudentius evadit ex continuo progressu, ut senescens judicio sit acriore, solidiore, et maturiore."

[1] This remark, however much in the manner of Lucian, is not his, but Seneca's. It has been preserved to us by Lactantius, who quotes it in his work *De falsa Religione*, i. c. 16. Every one remembers the "adeo senuerunt Jupiter et Mars?" of Juvenal. Seneca however refers to Jupiter only.

[2] Liv. ix. 17.

[3] The story of Columbus's egg is one of those popular anecdotes which no refutation can get rid of. It was first told by Benzoni, and then greatly embellished by Theodore de Bry, and is in reality only a reproduction of a story perhaps not more authentic told of Brunellesco, the architect, who erected the dome of the cathedral at Florence. See Humboldt in his *Examen Critique de l'Histoire de Géographie*, &c., vol. iv. p. 152. Bacon is however quite right in saying that after his success Columbus's discovery was depreciated. "I was seven years at your court, and for seven years I was told that my plan was an absurdity," writes Columbus in 1503 to Ferdinand and Isabella; "and now the very tailors ask leave to go to discover new countries." "A quantos se fablo de mi empresa todos á una dijeron que era burla, agora fasta los sastres suplican por descubrir." Humboldt, l. c. vol. iii. p. 236.

autem factam, arripit eas mens per retractionem[1] quandam (ut loquuntur Jureconsulti), tanquam ante perspectas et cognitas.

Alius error superiori affinis, est eorum qui omnium sectarum atque hæresium veterum, postquam excussæ fuissent et ventilatæ, optimam semper obtinuisse posthabitis aliis existimant. Itaque putant, si quis de integro instituerat inquisitionem et examen, non posset non incidere in aliquas ex rejectis opinionibus, et post rejectionem amissis et obliteratis; quasi vero multitudo, aut etiam sapientes multitudinis deliniendæ gratia, non illud sæpe probarint quod populare magis atque leve sit, quam quod solidum atque alte radices agens. Tempus siquidem simile est fluvio, qui levia atque inflata ad nos devehit, solida autem et pondus habentia submergit.

Alius error a reliquis diversus, est præmatura atque proterva reductio doctrinarum in artes et methodos; quod cum fit, plerunque scientia aut parum aut nihil proficit. Nimirum ut ephebi, postquam membra et lineamenta corporis ipsorum perfecte efformata sunt, vix amplius crescunt; sic scientia, quamdiu in aphorismos et observationes spargitur, crescere potest et exurgere; sed methodis semel circumscripta et conclusa, expoliri forsan et illustrari aut ad usus humanos edolari potest, non autem porro mole augeri.

Alius error succedens ipsi quem postremo notavimus, est quod post singulas scientias et artes suas in classes distributas, mox a plerisque universali rerum cognitioni et Philosophiæ Primæ renunciatur; quod quidem profectui doctrinarum inimicissimum est. Prospectationes fiunt e turribus aut locis præaltis, et impossibile est ut quis exploret remotiores interioresque scientiæ alicujus partes, si stet super plano ejusdem scientiæ, neque altioris scientiæ veluti speculam conscendat.

Alius error fluit ex nimia reverentia et quasi adoratione intellectus humani; unde homines abduxere se a contemplatione naturæ atque ab experientia, in propriis meditationibus et ingenii commentis susque deque volutantes. Cæterum præclaros hos opinatores et (si ita loqui licet) Intellectualistas, qui tamen pro maxime sublimibus et divinis philosophis haberi solent, recte Heraclitus perstrinxit; *Homines*, inquit, *quærunt veritatem in microcosmis suis, non in mundo majori.*[2] Respuunt enim quasi

[1] We ought doubtless to read *retroactionem*, but as the meaning is obvious I have not thought it necessary to introduce the change into the text.

[2] See Nov. Org. i. § 42.

abecedarium naturæ, primumque in operibus divinis tirocinium; quod si non facerent, potuissent fortasse gradatim et sensim, post literas simplices et deinceps syllabas, ad textum et volumen ipsum creaturarum expedite legendum ascendere. At illi contra jugi mentis agitatione urgent et tanquam invocant suos Genios, ut vaticinentur eis edantque oracula, quibus merito et suaviter decipiuntur.

Alius error huic posteriori finitimus est, quod homines sæpius imbuant et inficiant meditationes et doctrinas suas opinionibus quibusdam et conceptibus propriis, quos potissimum in admiratione habent, aut artibus quibus maxime addicti et consecrati sunt; cætera omnia illis deliciis inficientes et quasi intingentes, licet fuco admodum fallaci. Sic suæ philosophiæ immiscuit Plato theologiam, Aristoteles logicam, secunda schola Platonis (Proclus scilicet et reliqui) mathematicas. Istas enim artes solebant illi tanquam filiolos suos primogenitos suaviari. At Chymici e paucis experimentis ad foculum et fornacem novam philosophiam excuderunt. Et Gilbertus, popularis noster, philosophiam aliam ex magnete elicuit.[1] Sic Cicero, cum varias opiniones de natura animæ recensens, tandem in musicum incidisset, qui animam esse harmoniam statuebat, facete dixit; *Hic ab arte sua non recessit.*[2] Sed de hoc genus erroribus apposite et prudenter ait Aristoteles, *Qui respiciunt ad pauca, de facili pronunciant.*[3]

Alius error est impatientia dubitandi, et cœca festinatio decernendi absque debita et adulta suspensione judicii. Nam bivium contemplationis non est dissimile bivio actionis a veteribus sæpius memorato; cujus altera via initio plana et facilis erat fine autem impervia; altera ingredienti aspera erat et confra-

[1] Of the writings of William Gilbert of Colchester, thus slightingly spoken of, Galileo has left this judgment: "Io sommamente laudo ammiro & invidio questo autore per essergli caduto in mente concetto tanto stupendo circa cosa maneggiata di infiniti ingegni sublimi, nè da alcuno avvertita; parmi anco digno di grandissima laude per le molte nuove & vere osservazioni fatte da lui in vergogna di tanti autori mendaci & vani, che scrivono non sol quel che sanno ma tutto quello che senton dire dal volgo sciocco senza cercare di assicurarsene con esperienza, forse per non diminuire i lor libri. Quello che avrei desiderato nel Gilberti è, che fusse stato un poco maggior matematico, & in particolare ben fondato nella geometria, la pratica della quale l' avrebbe reso men risoluto nell' accettare per concludenti dimostrazioni quelle ragioni ch' ei produce per vere cause delle vere conclusioni da se osservate."— *Dialogi dei massimi Sistemi.*

Compare for the opinion of modern scientific writers, Dr. Whewell's *History of the Inductive Sciences.*

The "concetto tanto stupendo" here mentioned refers to Gilbert's notion of the magnetic polarity of the globe.

[2] "Hic ab artificio suo non recessit."— *Tusc. Quæst.* i. c. 10.

[3] De Generatione et Corrupt. i. 2.

gosa, ubi paulo processeris expedita et æquabilis. Haud secus in contemplationibus, si quis a certis ordiatur, in dubia desinet; sin a dubiis incipiat eaque aliquandiu patienter toleret, in certis exitum reperiet.

Similis error se ostendit in modo tradendi doctrinam, qui ut plurimum est imperiosus et magistralis, non ingenuus et liberalis; ita demum compositus, ut potius fidem imperet quam examini subjiciatur. Non negaverim in summariis libellis ad praxim destinatis hanc formulam scribendi retineri posse, verum in justis tractatibus de scientiis utrumque extremum vitandum censeo, tam Velleii Epicurei, nil tam metuentis quam ne dubitare de re aliqua videretur [1], quam Socratis et Academiæ omnia in dubio relinquentium. Candori potius studendum, resque majore aut minore contentione tradendæ, prout rationum momentis parcius aut plenius sint probatæ.

Alii errores sunt in scopis quos homines præfigunt sibi, et in quos conatus suos et labores dirigunt. Cum enim diligentiores literarum Coryphæi ad id collimare debeant præcipue, ut arti quam profitentur aliquid præclarum adjiciant; hi contra in secundis tantummodo consistere sat habent; vel subtilis interpretis, vel antagonistæ vehementis et nervosi, vel methodici abbreviatoris, nomen ambientes; unde reditus et vectigalia scientiarum augeri possunt, patrimonium et fundus minime.

Omnium autem gravissimus error in deviatione ab ultimo doctrinarum fine consistit. Appetunt enim homines scientiam, alii ex insita curiositate et irrequieta; alii animi causa et delectationis; alii existimationis gratia; alii contentionis ergo, atque ut in disserendo superiores sint; plerique propter lucrum et victum; paucissimi ut donum rationis divinitus datum in usus humani generis impendant. Plane, quasi in doctrina quæreretur lectulus, in quo tumultuans ingenium et æstuans requiesceret; aut xystus sive porticus, in quo animus deambularet liber aut vagus; aut turris alta et edita, de qua mens ambitiosa et superba despectaret; aut arx et propugnaculum ad contentiones et prælia; aut officina ad quæstum et mercatum; et non potius locuples armarium et gazophylacium, ad opificis rerum omnium gloriam et vitæ humanæ subsidium. Hoc enim illud est, quod revera doctrinam atque artes condecoraret et attolleret, si contemplatio et actio arctiore quam

[1] Cicero, De Nat. Deor. I. c. 8. [Compare Nov. Org. i. 67.]

adhuc vinculo copularentur. Quæ certe conjunctio talis foret, qualis est supremorum duorum planetarum syzygia, cum Saturnus, quietis et contemplationis dux, cum Jove, duce societatis agendique, conspiret.[1] Quanquam cum de praxi atque actione loquor, nullo modo ad doctrinam professoriam et lucrosam innuo. Neque enim me fugit, quantopere hoc ipsum progressionem doctrinæ et amplificationem moretur; perinde quidem ut aureum malum ante oculos Atalantæ projectum, quod ut tollat dum flectit se, cursus interea impeditur;

Declinat cursus, aurumque volubile tollit.[2]

Neque rursus mihi in animo est, quod de Socrate dictum erat, *Philosophiam devocare de cœlo, ut tantummodo versaretur in terris*[3]; hoc est, Physicam seponi, ut Moralis Philosophia et Politica celebraretur sola; sed quemadmodum cœlum et terra simul conspirant et consentiunt ad hominum tuendam vitam atque juvandam, ita sane hic finis esse debet utriusque Philosophiæ, ut rejectis vanis speculationibus et quidquid inane ac sterile est, conservetur quidquid solidum est ac fructuosum; ut hoc pacto Scientia non sit tanquam scortum, ad voluptatem, aut tanquam ancilla, ad quæstum; sed tanquam sponsa, ad generationem, fructum, atque solatium honestum.

Jam explicasse videor et quasi dissectione quadam aperuisse vitiosos illos humores, aut saltem eorum præcipuos, qui non solum obstitere profectui literarum, verum etiam culpandis iisdem ansam dedere. Quod quidem si nimis ad vivum fecerim, meminisse oportet, *Fidelia vulnera amantis, sed dolosa oscula malignantis.*[4] Utcunque, hoc certe mihi videor assecutus, ut merear fidem in sequenti præconio, cum superiori censura tam libere egerim. Neque tamen in animo est mihi panegyricum literarum scribere, aut hymnum Musis præcinere, licet forsitan diu jam sit ex quo sacra earum rite celebrata sint; sed consilium est absque pigmentis et hyperbolis verum doctrinæ contra alias res pondus excipere et perpendere, verumque ejus valorem et pretium ex testimoniis divinis atque humanis exquirere.

Primo igitur quæramus dignitatem scientiæ in archetypo, sive exemplari[5]: id est, in attributis atque actis Dei, quatenus

[1] This conjunction cannot however take place without in some measure affecting the good influences of Jupiter. So at least we are told by astrological writers. "Saturnus conjunctus Jovi bona decernit in Saturni significatis, verum minuuntur significata beneficia Jovis."—*Argolo, Parv. Ptolem.* p. 47.

[2] Ovid, Metam. x. 667. [3] Cicero, Tusc. v. c. 4. [4] Proverbs, xxvii. 6.

[5] In illustration of this word we may refer to Philo-Judæus, who in the commence-

revelantur homini, et sobrie indagari possunt. Qua in re non competit appellatio Doctrinæ, cum omnis doctrina sit scientia acquisita; nulla autem cognitio in Deo acquisita est, sed originalis. Itaque aliud quærendum est nomen, *Sapientia* scilicet, ut Sacræ Scripturæ eam indigitant.

Sic autem se res habet: In operibus creationis duplicem virtutis divinæ emanationem videmus, quarum una ad potentiam refertur, altera ad sapientiam.[1] Illa præcipue cernitur in creanda mole materiæ, hæc in pulchritudine formæ disponenda.[2] Hoc posito notandum est, nihil in creationis historia obstare, quin fuerit confusa illa cœli terræque massa et materia unico temporis momento creata; cui tamen disponendæ digerendæque sex dies fuerunt attributi: adeo signanter Deus opera potentiæ ac sapientiæ discriminavit. Cui accedit, quod de materiæ creatione memoriæ proditum non sit dixisse Deum, *Fiat cœlum et terra*, sicut de sequentibus operibus dictum est; sed nude atque actualiter, *Deus creavit cœlum et terram*[3]: ita ut materia videatur tanquam manu facta, formæ vero introductio stilum habeat legis aut decreti.[4]

Pergamus a Deo ad Angelos, quorum natura dignatione est Deo proxima. Videmus in ordinibus Angelorum (quatenus fides adhibenda Cœlesti illi Hierarchiæ, quæ Dionysii Areopagitæ nomine evulgatur[5]) primum locum obtinere *Seraphim*, Angelos scilicet amoris; secundum *Cherubim*, Angelos illuminationis; tertium autem locum et sequentes *Thronis*, *Principatibus*, cæterisque Angelis potentiæ et ministerii concedi; ut

ment of his tract *De Opificio Mundi*, expounds the first five verses of Genesis, on the assumption that they relate, not to any material creation, but to the formation in the divine mind of the archetype or exemplar of the visible universe.

[1] The first of these is by the schoolmen ascribed more especially to the first, and the second to the second person of the Trinity.

[2] It is to be hoped that M. Lemaistre, who in his work entitled *Examen de la Philosophie de Bacon* has charged him with asserting the eternity of matter, was not acquainted with this passage. It would have been well for M. Lemaistre's reputation, if the *Examen*, which was published after his death, had been suppressed. It is disfigured by passionate unfairness, and in many passages by ignorance almost incredible.

[3] Gen. i. 1.

[4] It seems that materia and forma are here taken in antithesis to each other; on which it is to be remarked that on the principles of the philosophy to which this antithesis belongs, the existence of matter could not precede in order of time the "introductio formæ;" for we cannot have ens actu sine actu. If the order of time be taken account of, we must say that the formation in question was not the introduction of substantial form, but that of the order and beauty of the universe. And thus S. Thomas, *Sum. Theol.* i. q. 66. a. 1.

[5] *De Cœlesti Hierarchiâ*, cc. 6. 7. This work, in the genuineness of which no one probably now believes, exercised great influence on the mediæval development of the doctrine of the natures and functions of angels. Another work ascribed to the same author, namely the *De Divinis Nominibus*, has been commented by S. Thomas Aquinas.

ex hoc ipso ordine ac distributione clarum sit, Angelos scientiæ et illuminationis Angelis imperii et potentiæ præponi.

A Spiritibus et Intelligentiis ad formas sensibiles et materiatas descendentes, legimus primam formarum creatarum fuisse Lucem; quæ in naturalibus et corporeis, Scientiæ in spiritualibus atque incorporeis respondet.[1]

Sic in distributione dierum, videmus diem qua requievit Deus et contemplatus est opera sua benedictam fuisse supra omnes dies quibus creata est et disposita fabrica universi.

Post creationem absolutam legimus Hominem collocari in Paradiso, ut illic operaretur; quod quidem opus aliud esse non poterat quam quale pertinet ad contemplandum; hoc est, cujus finis non ad necessitatem aliquam, sed ad delectationem et activitatem sine molestia, referri possit. Cum enim tunc temporis nulla potuerit esse creaturæ reluctatio, nullus *sudor vultus*, necessario sequitur actiones humanas ad voluptatem et contemplationem, non ad laborem aut opus, comparatas fuisse. Rursus, primæ hominis actiones, quas in Paradiso exercuit, duas summarias scientiæ partes complexæ sunt. Hæ erant, inspectio creaturarum, et impositio nominum. Nam scientia illa quæ lapsum introduxit (quod et ante monuimus) non erat naturalis scientia circa creaturas, sed moralis scientia de Bono et Malo; ex hac suppositione, quod Dei mandata aut vetita non essent principia Boni et Mali, sed quod alias haberent illa origines; quorum cognitionem affectavit homo, scilicet ut totaliter a Deo deficeret, et sibi ipsi suoque arbitrio prorsus inniteretur.[2]

Veniamus ad ea quæ statim post lapsum contigere. Videmus (ut innumera sunt Sacrarum Scripturarum mysteria, salva semper veritate historica et literali) imaginem duarum vitarum, contemplativæ nimirum et activæ, in personis Abelis et Caini, inque eorum institutis et primitivis vivendi rationibus delineatam; quorum alter pastor erat (qui propter otium et quietum liberumque cœli aspectum typus est vitæ theoricæ), alter agri-

[1] Whether the first created light were material or spiritual was a much discussed question. S. Augustine is decidedly inclined to the opinion of its being spiritual, which was apparently suggested by the circumstance that no mention is made in the first chapter of Genesis of the creation of angels. For on this view the primitive light was in reality the angelic nature.

[2] "Primus homo peccavit principaliter appetendo similitudinem Dei quantum ad scientiam boni et mali, sicut serpens ei suggessit, ut scilicet per virtutem propriæ naturæ determinaret sibi quid esset bonum et quid malum ad agendum."—*S. Thomas, Sum. Theol. Sec. Secund.* q. 163. a. 2.

cola (laboribus scilicet fatigatus, et aspectu in terram defixus). Ubi cernere est, favorem electionemque divinam ad pastorem accessisse, non ad agricolam.[1]

Sic ante Diluvium, Sacri Fasti, inter paucissima quæ de eo sæculo memorantur, dignati sunt memoriæ prodere inventores musicæ atque operum metallicorum. Sequenti sæculo post Diluvium, gravissima pœna qua Deus humanam superbiam ultus est fuit confusio linguarum, qua doctrinæ liberum commercium et literarum ad invicem communicatio maxime interclusa est.

Descendamus ad Mosem legislatorem et primum Dei notarium, quem Scripturæ ornant hoc elogio, quod *gnarus et peritus esset omnis doctrinæ Ægyptiorum.*[2] Quæ quidem gens inter vetustissimas mundi scholas numeratur. Sic enim Plato inducit Ægyptium sacerdotem dicentem Soloni: *Vos Græci semper pueri estis, nullam vel scientiam antiquitatis vel antiquitatem scientiæ habentes.*[3] Perlustremus Cæremonialem Legem Mosis, reperiemusque (præter Christi præfigurationem, distinctionem populi Dei a gentibus, exercitium obedientiæ, aliosque ejusdem legis usus sacros) nonnullos doctissimorum Rabbinorum haud inutilem circa eam navasse operam, ut sedulo eruerent, quandoque naturalem, quandoque moralem sensum cæremoniarum et rituum. Exempli gratia: ubi de lepra dicitur, *Si efflorverit discurrens lepra, homo mundus erit et non recludetur: sin caro viva in eo erit, immunditiæ condemnabitur, et ad sacerdotis arbitrium separabitur.*[4] Ex hac lege colligit unus eorum axioma in natura: *Putredinem pestilentiorem esse ante quam post maturitatem.* Alius morale documentum elicit: *Homines flagitiis undique coopertos minus corrumpere publicos mores, quam mediocriter ex parte tantum malos:* adeo ut ex hoc et similibus locis ejus legis, præter sensum theologicum, haud pauca ad philosophiam spectantia spargi videantur.

Si quis etiam eximium illum Jobi librum diligenter evol-

[1] By Philo-Judæus, whom Bacon has more than once quoted, Cain is taken as the type of the frame of mind which leads us to refer to ourselves the origin of our thoughts and energies,— Abel of that which refers all things to God. See also Augustin, *Civ. Dei*, xv. 1. From this view the transition to that of the text is easy. The generally recognised types of the active and contemplative ways of life are, I think, Rachel and Leah in the Old Testament, Mary and Martha in the new. See S. Augustine, *De Consens. Evangelist.* i., for what is said of Leah and Rachel, and S. Thomas Aquinas, *Sum. Theol.* 2da 2^{dae} q. 179. a. 2.

[2] Acts, vii. 22.

[3] Timæus, p. 22. b. [See Nov. Org. i. 71.]

[4] Levit. xiii. 12.

verit, plenum eum et tanquam gravidum naturalis philosophiæ mysteriis deprehendet.[1] Exempli gratia; circa cosmographiam et rotunditatem terræ illo loco, *Qui extendit aquilonem super vacuum, et appendit terram super nihilum*[2]; ubi pensilis terra, polus arcticus, et cœli convexitas in extimis, haud obscure insinuantur. Rursus circa astronomiam et asterismos, illis verbis: *Spiritus ejus ornavit cœlos, et obstetricante manu ejus eductus est coluber tortuosus.*[3] Et alio loco: *Nunquid conjungere valebis micantes stellas Pleiadas, aut gyrum Arcturi poteris dissipare?*[4] ubi immota configuratio stellarum fixarum, paribus intervallis semper inter se distantium, elegantissime describitur. Item alio loco: *Qui facit Arcturum, et Oriona, et Hyadas, et interiora Austri*[5]; ubi iterum innuit depressionem antarctici poli, eamque designat nomine *interiorum Austri*, quia australes stellæ nostro hemisphærio non cernuntur. Circa generationem animalium: *Annon sicut lac mulsisti me, et sicut caseum coagulasti me*[6]? &c. Circa rem metallicam: *Habet argentum venarum suarum principia, et auro locus est in quo conflatur, ferrum de terra tollitur, et lapis solutus calore in æs vertitur*[7]: et sequentia in eodem capite.

Pariter et in persona regis Salomonis videmus donum sapientiæ, tum in petitione ipsius tum in concessione divina, omnibus terrenæ et temporalis fœlicitatis bonis prælatum; virtute cujus doni et concessionis Salomon egregie instructus, non solum scripsit insignes illas parabolas sive aphorismos de divina atque morali philosophia, verum etiam composuit naturalem historiam omnium vegetabilium, *a cedro super montem usque ad muscum super murum*[8] (qui nihil est aliud quam rudimentum plantæ, putredinis et herbæ medium), omniumque etiam quæ respirant et moventur. Imo idem rex Salomon, quamvis excelluerit opibus, magnificentia ædificiorum, classe, famulitio, nominis celebritate, et reliquis quæ ad gloriam pertinent, nihil tamen ex ista gloriæ segete sibi ipsi decerpit aut assumit, præter decus inquirendi et inveniendi veritatem. Sic enim diserte ait: *Gloria Dei est celare verbum, et gloria regis investigare sermonem.*[9] Ac si Divina Majestas innoxio illo et benevolo

[1] A similar view of the book of Job will be found in *Giordano Bruno*. See his works, i. 174. of Wagner's edition.

[2] Job, xxvi. 7. [3] Job, xxvi 13.

[4] Job, xxxviii. 31; where however the English version is different.

[5] Job, ix. 9. In our version the Hyades are replaced by the Pleiades.

[6] Job, x. 10.

[7] Job, xxviii. 1, 2. [8] 1 Kings, iv. 33. [9] Proverbs, xxv. 2.

puerorum ludo delectaretur, qui ideo se abscondunt ut inveniantur; quasique etiam nihil esset honorificentius regibus, quam Dei collusores esse in eodem ludo; præsertim cum tot ingeniis imperent, tantasque opes præsto habeant, quibus omnis secreti investigatio absolvi possit.

Nec vero aliter hæc dispensavit Deus, postquam Salvator noster in mundum venisset. Ille enim prius potentiam ostendit suam in profliganda ignorantia, ubi cum doctoribus et sacerdotibus dissereret in Templo, quam in subjuganda natura tot et tantis editis miraculis. Adventus quoque Spiritus Sancti præcipue adumbratus atque expressus fuit in similitudine ac dono linguarum, quæ sunt duntaxat *vehicula scientiæ*.

Ita in seligendis illis instrumentis quæ adhibuit Deus ad fidem disseminandam, initio homines evocavit plane indoctos et illiteratos, præterquam quod Spiritus Sancti afflatu instructi fuissent; quo evidentius virtutem suam immediatam et divinam declararet, omnemque humanam sapientiam deprimeret. Quamprimum autem consilium suum in hac parte perimpletum esset, mox in proxima successione temporum, divinam veritatem suam aliis doctrinis veluti pedissequis comitatam in mundum immisit. Itaque D. Pauli calamus (qui inter Apostolos solus literatus fuit[1]), in Scripturis Novi Testamenti præcipue a Deo adhibitus est.

Sic et novimus complures ex antiquis episcopis et patribus egregie fuisse in omni ethnicorum eruditione versatos. Adeo ut Edictum Juliani, quo cautum est ne Christiani ad scholas et gymnasia mitterentur[2], perniciosior machina ad expugnandam fidem Christianam, quam cruentæ superiorum imperatorum persecutiones habitum fuerit. Neque Gregorii Primi, episcopi Romani, (cætera viri egregii) æmulatio et invidentia, qui ethnicorum authorum et antiquitatum memoriam obliterare studebat[3], in bonam partem etiam apud viros pios accepta est.

[1] It has been thought however that St. James must have been acquainted with astronomy. This opinion is founded on the phrase rendered in the English version "variableness or shadow of turning;" his meaning being, it is said, that neither parallax nor the alternate approach to and receding from the solstice affects the Sun of Suns, whose aspect is the same at all places and throughout all time. Certainly if no astronomical allusion be intended, it is curious to see how easily the expressions used admit of this interpretation.

[2] See Ammianus Marcellinus, xxii. c. 10. and xxv. c. 6., and compare Gibbon, who points out that the edict only forbids Christian professors to teach. S. Augustine relating what he had been told by Simplicianus makes the latter say, "Imperatoris Juliani temporibus lege datâ prohibiti sunt Christiani docere literaturam et oratoriam." —*Confess.* viii. 5.

[3] See with respect to this charge the references collected in Dunlop's *History of*

Quinimo sola Christiana Ecclesia, inter inundationes Scytharum a plagis septentrionalibus et Saracenorum ab orientalibus, pretiosas gentilis eruditionis reliquias, jamjam funditus perituras, sinu et gremio suo conservavit. Nuper etiam intueri licet Jesuitas, qui (partim studio proprio, partim ex æmulatione adversariorum, literis strenue incubuerunt) quantum subsidii viriumque Romanæ Sedi reparandæ et stabiliendæ attulerint.

Quare, ut absolvam hanc partem, duo sunt præcipua officia et ministeria, præter ornatum et illustrationem, quæ Fidei Religionique humaniores literæ persolvunt. Unum, quod efficacia sint incitamenta ad divinam gloriam exaltandam et celebrandam; sicut enim Psalmi et aliæ Scripturæ crebro nos invitant ad contemplationem prædicationemque magnificorum et admirabilium operum Dei, ita si tantum in eorum specie externa sicut sensibus nostris se exhibent hæreremus, eandem faceremus injuriam Majestati Divinæ, ac si de opulentia et copia nobilissimi gemmarii ex iis quæ palam exponuntur in pergula judicaremus. Alterum, quod singulare remedium antidotumque exhibeat Philosophia contra infidelitatem et errores. Nam Salvator noster inquit: *Erratis nescientes Scripturas et potentiam Dei.*[1] Ubi duos libros, ne in errores incidamus, proponit nobis evolvendos; primo volumen Scripturarum, quæ voluntatem Dei, dein volumen Creaturarum, quæ potentiam revelant: quorum posterior veluti clavis est prioris, non solum intellectum nostrum aperiens ad genuinam Scripturarum mentem ex generalibus regulis rationis et legibus sermonis expromendam; sed porro etiam præcipue fidem nostram reserans, ut in seriam ingrediamur Omnipotentiæ Divinæ meditationem, cujus characteres maxime insculpti ejus operibus et incisi sunt. Tantum de Divinis testimoniis ac judiciis, pro vera dignitate et pretio doctrinæ, dictum sit.

Quantum ad Humana testimonia et argumenta, tam latus aperitur campus, ut in tractatu hoc brevi et presso delectum potius adhibere deceat quam copiam. Primo itaque summus apud ethnicos honoris gradus fuit, divinam venerationem cultumque consequi; (quod quidem Christianis est tanquam fructus

Roman Literature (1823), ii. 510. It is strangely transferred by Mr. Disraeli in the *Curiosities of Literature* to Gregory VII. Mersenne, ubi supra, objects to Bacon's not giving the title of Saint to Gregory. This would not be worth mentioning if it did not show how little he could find to criticise.

[1] Matt. xxii. 29.

vetitus; nunc vero loquimur separatim de judiciis humanis). Itaque (ut cœpimus dicere) apud ethnicos ille quem Græci *Apotheosin*, Latini *Relationem inter Divos* vocarunt, supremus honor fuit, qui homini ab homine tribui posset; præsertim ubi non ex decreto aut edicto aliquo imperii (ut Cæsaribus apud Romanos), sed ex opinione hominum et fide interna ultro deferretur. Cujus honoris tam excelsi gradus quidam erat, et terminus medius. Quippe supra humanos honores, heroïci numerabantur et divini; in quorum distributione hunc ordinem tenuere veteres. Rerumpublicarum conditores, legislatores, tyrannicidæ, patres patriæ, quique in rebus civilibus optime meruerunt, insigniti sunt titulo Heroum tantum, aut Semideorum; quales fuere Theseus, Minos, Romulus, ceterique. Ex altera parte inventores et authores novarum artium, quique vitam humanam novis commodis et accessionibus dotarunt, semper consecrati sunt inter Deos ipsos Majores; quod Cereri, Baccho, Mercurio, Apollini, et aliis contigit. Quod certe jure et sano cum judicio factum est. Nam priorum benemerita intra unius ætatis aut nationis limites fere coërcentur; nec absimilia sunt imbribus tempestivis et benignis, qui quamvis frugiferi sint atque optabiles, tamen pro illa tempestate tantum qua decidunt, atque pro amplitudine tractus terræ quam irrigant, utiles sunt; posteriorum vero beneficia, ut ipsius solis et cœlestium munera, temporibus perpetua, locis infinita sunt. Illa rursus cum contentione et perturbatione ut plurimum conjuncta sunt; hæc habent verum characterem Divinæ Præsentiæ, veniuntque in *aura leni*[1], absque tumultu aut strepitu.

Neque sane doctrinæ meritum in civilibus et in reprimendis incommodis quæ homo homini infert, multum cedit illi alteri in sublevandis humanis necessitatibus quæ ab ipsa natura imponuntur. Atque hoc genus meriti optime adumbratum fuit sub illa ficta narratione de theatro Orphei; ubi singulæ bestiæ avesque congregatæ sunt, quæ appetituum suorum innatorum immemores, prædæ, ludi, pugnæ, amice placideque una stetere, citharæ concentu et suavitate captæ; cujus sonus ubi aut cessaret aut majori sonitu obrueretur, omnes illico animantes ad ingenium redibant. Qua in fabula eleganter describuntur ingenia et mores hominum, qui variis et indomitis cupiditatibus agitantur, lucri, libidinis, vindictæ; qui tamen quamdiu aures

[1] "Post ignem sibilus auræ lenis."—1 *Kings*, xix. 12. I quote from the Vulgate, as the English version, "a still small voice," presents a different image.

præbent præceptis et suasionibus religionis, legum, magistrorum, in libris, sermonibus, et concionibus eloquenter et suaviter modulantibus, tamdiu pacem colunt et societatem; sin ista sileant aut seditiones et tumultus obstrepant, omnia dissiliunt et in anarchiam atque confusionem relabuntur.

Sed enim hoc clarius cernitur, cum reges ipsi aut magnates aut præfecti eruditione præditi sint. Utut enim suis addictus nimium partibus videatur, qui dixit[1], *Tum demum respublicas fore felices, cum aut philosophi regnant, aut reges philosophantur;* hoc tamen experientia notum est, sub eruditis principibus et custodibus reipublicæ sæcula maxime fœlicia fuisse. Quamvis enim reges ipsi suos habeant errores et vitia, affectibus scilicet et pravis consuetudinibus pro more cæterorum hominum obnoxii; tamen doctrinarum si accedat lumen, anticipatæ quædam notiones religionis, prudentiæ, honestatis, retinent eos, et ab omni præcipiti et immedicabili excessu et errore refrænant; aurem semper vellentes, etiam cum consiliarii et domestici silent. Quin senatores ipsi et consiliarii qui literis exculti sunt, solidioribus innituntur principiis quam qui ab experientia tantum edocti sunt; illis ex longinquo prospicientibus pericula et mature propulsantibus, cum isti tantum ex propinquo et cominus sapiant, nihil videntes nisi quod imminet, et tunc demum agilitate ingenii sui se in ipso periculorum articulo expedire et eripere posse confidentes.

Quæ fœlicitas temporum sub eruditis principibus (ut semper brevitati studeam, adhibens non nisi lectissima quæque exempla et maxime illustria) præcipue cernitur eo in sæculo, quod a morte Domitiani imperatoris usque ad imperium Commodi defluxit; successionem sex principum eruditorum, aut certe eruditioni impense faventium, complectente; omniumque (si temporalia bona spectemus) quæ unquam vidit Roma, totius orbis tunc epitome, longe florentissimo. Id quod Domitiano, pridie ejus diei quo interfectus est, in somnis præmonstratum erat; quippe qui videre visus est *caput aureum sibi pone cervicem enatum esse*[2]; quod sane vaticinium aureis illis subsequentibus sæculis adimpletum est; de quibus sigillatim sed brevissime verba faciam.

Nerva vir doctus fuit, Apollonii illius Pythagorei familiaris

[1] Plato in the fifth book of the *Republic.*

[2] Suetonius in Domitiano, sub finem; who however speaks only of a golden excrescence.

et quasi discipulus, qui etiam fere expiravit in versu illo Homeri,

Telis, Phœbe, tuis lacrymas ulciscere nostras.[1]

Trajanus non ipse quidem doctus, sed doctrinæ admirator et erga literatos munificus, bibliothecarum institutor, et in cujus aula (licet imperatoris bellicosi) professores et pædagogos gratiosissimos fuisse memoriæ proditum est. *Adrianus* curiosissimus mortalium, et inexplebilis omnis varietatis et secreti investigator.[2] *Antoninus* subtilis et quasi scholasticus, unde etiam *Cymini Sector*[3] vocatus est. Ex Divis Fratribus autem, *Lucius Commodus* molliori literarum genere eruditus; *Marcus* etiam cognomine ipso philosophus. Hi principes, ut doctissimi, ita et optimi fuerunt. *Nerva* clementissimus imperator, quique, si nihil aliud, orbi Trajanum dedit. *Trajanus*, omnium qui imperarunt, et belli et pacis artibus maxime florens; idem imperii fines longissime protulit; idem vim dominationis modestissime cohibuit; maximorum etiam exstructor operum, unde a Constantino *Parietaria*[4] per invidiam vocatus est, propter nomen ejus tot parietibus incisum. *Adrianus* temporis ipsius æmulus; injurias enim et ruinas temporis, in quoquo genere, cura et munificentia sua reparavit. *Antoninus* (ut etiam appellatus est) vir maxime *Pius*, nativa quadam et insita bonitate omnibus ordinibus gratus, cujusque regnum (licet haud breve) omnis calamitatis expers. *Lucius Commodus* fratri quidem bonitate cedens, reliquos imperatores plurimos superans. *Marcus*, vir ad exemplar virtutis compositus, cuique scurra[5] ille in Convivio Deorum nihil habuit quod objiceret, præter patientiam erga mores uxoris. In hac itaque continua sex principum serie videre cuivis liceat fœlicissimos fructus doctrinæ in imperio collocatæ, in maxima orbis terrarum tabula depictos.

Jam vero doctrina non in civilia tantum atque artes pacis influxum habet, sed et in militari virtute exercet vim suam ac potentiam; ut clare perspicitur in exemplis Alexandri Magni et Cæsaris dictatoris; quorum antea obiter meminimus, nunc vero ea paulo fusius retractabimus. Horum virtutes militares

[1] Iliad, i. 42. See Dio Cassius, or rather Xiphilinus in Nervâ.

[2] Besides which he has left some well known Latin verses, and in the *Greek Anthology* one or two pieces are ascribed to him, so that he must at least have had the reputation of being a Greek poet.

[3] Κυμινοπρίστης. Xiph. in Anton. Pio.

[4] Aurelius Victor, Epist. c. 41.

[5] Silenus; v. the *Cæsars* of Julian.

et res in bello gestas supervacaneum esset notare aut recensere, cum in eo genere mundi miracula exstiterint; sed de amore ipsorum et studio erga literas, necnon in iisdem excellentia propria, non alienum erit si pauca subjungamus.

Educatus fuit Alexander edoctusque ab Aristotele (philosopho certe magno), qui nonnullos e libris suis philosophicis ei nuncupavit. A latere illius nunquam discedebat Callisthenes aliique pereruditi viri, qui castra sequebantur, et perpetui erant omnium ejus itinerum et expeditionum comites. Quo autem pretio literas habuerit, haud pauca liquido demonstrant; veluti invidia qua dignam censuit Achillis fortunam, quod gestarum rerum laudumque suarum Homerum præconem invenerat; judicium de pretiosa Darii arcula inter reliqua spolia reperta, de qua cum quæstio moveretur quidnam potissimum dignum esset quod in ea asservaretur, ipse, cum alii alia dicerent, pro Homeri operibus sententiam tulit[1]; epistola objurgatoria ad Aristotelem missa, postquam libros Physicorum edidisset, in qua expostulat quod philosophiæ mysteria evulgasset; simulque rescribit malle se omnibus doctrina et cognitione quam potentia ac imperio præcellere.[2] Sunt et alia quæ huc spectant. Ipse vero quam egregie animum excoluisset doctrina, in omnibus ejus dictis et responsis apparet, vel potius refulget, eruditione plenissimis; in quibus, licet numero pauca sint quæ adhuc supersint, singularum scientiarum vestigia alte impressa reperias.

In Moralibus, observetur primo Alexandri apophthegma circa Diogenem, et adverte (si placet) si forte non unam ex gravissimis quæstionibus Moralis Philosophiæ constituat: *Utrum qui fruitur externis bonis felicior sit, an qui contemnit?* Cum enim Diogenem cerneret tam parvo contentum, conversus ad circumstantes, qui ejus conditionem subsannabant, *Nisi essem*, inquit, *Alexander, optarem esse Diogenes.* At Seneca in hac comparatione Diogenem prætulit, cum diceret, *Plus erat quod Diogenes nollet accipere, quam quod Alexander posset dare.*[3]

In Naturalibus, observetur illud quod crebro usurpabat, *In duabus se rebus mortalitatem suam maxime percipere, somno et libidine*[4]*:* quod sane dictum ex intima Naturali Philosophia depromptum est, non tam Alexandrum quam Aristotelem aut Democritum sapiens; cum tam indigentia quam redundantia naturæ, per illa duo designata, mortis sint tanquam arrhabones.

[1] Pliny, vii. 19. [2] Plutarch in Alex. c. 7. [3] Seneca, De Benef. v. c. 4.
[4] Plutarch, "Quomodo amicus discernendus," &c.

In Poëticis, observetur dictum illud, quum sanguine e vulneribus ejus effluente, accerseret unum ex adulatoribus qui ei divinitatem tribuere solebat, *Specta*, inquit, *hominis iste sanguis est, non talis liquor qualem dixit Homerus Veneris e manu manasse, vulnerata a Diomede;* hoc dicto et poetas et assentatores suos et seipsum ridens.[1]

In Dialecticis, accipe reprehensionem illam argutiarum dialecticarum circa rejicienda et retorquenda argumenta, in dicto suo quo perstrinxit Cassandrum delatores patris sui Antipatri repellentem. Cum enim Alexander forte dixisset, *Nunquid putas hos homines tam longum iter suscepturos fuisse, nisi justam doloris causam habuissent?* respondit Cassander, *Imo hoc ipsum animos eis dedit, quod sperabant longinquitatem viæ obstituram quo minus calumnia proderetur. Euge*, inquit rex, *strophas Aristotelis, rem pro et contra detorquentes.*[2] Attamen hac ipsa quam in alio carpebat arte, cum res postularet, in commodum suum uti probe noverat. Ita enim accidit, ut Callisthenes (quem odio clam habebat, quod novæ ejus inter Divos relationi refragaretur) in quodam convivio rogatus esset ab una discumbentibus, ut oblectationis gratia (cum esset vir eloquentissimus) thema aliquod pro arbitrio sibi sumeret, de quo subito diceret; ille autem annuens, et laudes gentis Macedonicæ eligens, mirifico cum omnium applausu disseruit. At neutiquam hoc delectatus Alexander subjecit, *In bona causa facile est cuilibet esse eloquenti; quin verte*, inquit, *stilum, et quid contra nos possis audiamus.* Callisthenes negotium in se recepit, idque tam acerbe tamque aculeate præstitit, ut Alexander interpellans diceret, *Etiam malus animus, æque ac bona causa, indit eloquentiam.*[3]

In Rhetoricis, ad quæ tropi et ornamenta pertinent, ecce tibi elegantissimum metaphoræ usum, qua Antipatrum imperiosum et tyrannicum præsidem perstrinxit. Cum enim amicus quidam Antipatri laudaret eum coram Alexandro, quod tam moderatus esset, neque in Persicum (prout alii præfecti) luxum, usumque purpuræ, veteri Macedoniæ amictu exuto, degeneraret, *At intus*, inquit Alexander, *Antipater est totus purpureus.*[4] Etiam et illa

[1] Plutarch in Alexand., or in his tract on Alexander's fortunes. Rousseau tells a story of a Piedmontese nobleman, who happening while at table to cut his hand, remarked jestingly to those about him, "Messieurs, voilà du sang Pelasge."

[2] Plut. in Alexand. c. 74.

[3] Plut. in Alexand. c. 53.

[4] Plut. Apopthegms. Antipater was not praised for keeping to the Macedonian dress, but generally for the severity of his way of life. Bacon was probably misled by Eras-

metaphora insignis: cum Parmenio ad eum accederet in campis Arbellæ, eique ingentem hostium exercitum monstraret, qui oculis subjacens noctu propter infinitum numerum ignium veluti alterum firmamentum stellatum repræsentabat, ideoque consuleret ut nocturno prælio illos invaderet, *Nolo*, inquit Alexander, *suffurari victoriam.*[1]

In Politicis, attende gravissimam illam et prudentissimam distinctionem, (quam omnis posteritas amplexa est,) qua duos ex præcipuis ejus amicis, Hephæstionem et Craterum, discrevit, quum diceret *alterum Alexandrum amare, alterum amare regem*[2]; dissimilitudinem maximi ponderis etiam inter fidelissimos regum servos constituens, quod alii magis dominorum suorum personas vero affectu prosequantur, alii potius moveantur officio erga principatum ipsum. Spectetur etiam quam eximie redargueret errorem, principum consiliariis familiarem, qui plerumque consilia pro modulo sui animi et fortunæ, non dominorum, suggerunt. Cum enim Darius magnas Alexandro offerret conditiones, Parmenio, *Ego*, inquit, *si essem Alexander, acciperem.* Subjecit Alexander, *Et ego equidem, si essem Parmenio.*[3] Postremo, excutiatur acre illud atque acutum responsum ad amicos interrogantes, quid sibi reservaret cum tot et tanta donaret? *Spem*[4], inquit: quippe qui probe sciret, subductis rationibus, spem veram esse sortem et tanquam hæreditatem ad magna aspirantium. Hæc Julii Cæsaris sors, cum proficiscens in Galliam universas opes profusis largitionibus exhausisset. Hæc etiam sors Henrici Ducis Guisii, nobilissimi principis licet nimium ambitiosi, de quo illud increbuit, *Fœneratorem eum fuisse unum omnium Gallorum maximum, eo quod omnes opes in nominibus haberet, atque patrimonium universum in obligationes convertisset.*[5] Cæterum admiratio hujus principis, dum eum

mus, who took the story from Plutarch without rightly understanding it. Alexander compared Antipater to a λευκοπαρύφος (or white-striped) garment, which on the inside, the παρύφη or clavus being an external appendage, showed no trace of white, but was purple throughout. Erasmus confounded λευκοπαρύφος with λεύκος and apparently supposed the remark to refer to Antipater's dress. In the *Advancement of Learning* and in the *Apophthegms* Bacon speaks of the "Macedonian habit of black." See Erasm. Apophth. book iv. 17.

[1] Plut. in Alex. c. 31. [2] Ut supra, c. 47. [3] Ut supra, c. 29.

[4] Plut. in Alexand. c. 15., or De Alexandri Fortuna, p. 342. According to Plutarch, Alexander had only one friend, namely Perdiccas, disinterested enough to ask the question. In the *Apophthegms* the inaccuracy of the text is avoided, but Parmenio is substituted for Perdiccas. Τὰς ἐλπίδας in Alexander's reply is rather "that which I hope for" than "hope," — "mes espérances," not "l'espoir" in the abstract.

[5] It was said of him and Henry III. that the one was "Rè nell' affetto," and the

mihi non ut Alexandrum Magnum sed ut Aristotelis discipulum propono, longius fortasse me provexit.

Quantum ad Julium Cæsarem, non est opus ut de præstantia eruditionis ejus, aut ex educatione aut ex familiaribus aut ex responsis ejus conjecturam faciamus. Hæc siquidem eminet in ejus scriptis et libris, quorum alii exstant, alii infœliciter desiderantur. Primo enim, hodie in manibus habetur insignis illa bellorum suorum historia, cui nomen et titulum Commentariorum duntaxat præfixit; in quo omnes posteri solidum rerum pondus, et viva tam actionum quam personarum simulachra, cum castissima puritate sermonis narrationisque perspicuitate eximia conjuncta, admirantur; quas quidem dotes non a natura infusas fuisse sed a præceptis institutisque doctrinæ acquisitas, testatur liber ejus de *Analogia*[1], qui nihil aliud erat quam grammaticalis quædam philosophia; in quo sedulo dedit operam ut vox ad Placitum redderetur vox ad Licitum; et consuetudo quoquo modo loquendi ad congruitatem revocaretur emendate loquendi; et verba, quæ sunt rerum imagines, rebus ipsis convenirent, non vulgi prorsus arbitrium sequerentur.

Ita etiam, veluti monumentum doctrinæ non minus quam potentiæ, emendatam ejus edicto habemus computationem anni; quæ diserte testatur æque eum gloriæ sibi duxisse siderum in cœlis leges pernosse, ac hominibus in terris leges dedisse.

Ex libro quoque, cui titulum præposuit Anti-Cato[2], facile constat eum tanto studio accensum ad victoriam ingenii, quanto belli et armorum, obtinendam; certamen calami tum suscipientem contra maximum eo tempore pugilem, Ciceronem oratorem.

Rursus, in libro Apophthegmatum quæ collegit, videmus honorificentius sibi putasse si seipsum tanquam in tabellas aut codicillos mutaret, in quos prudentia aliorum dicta graviaque referrentur, quam si dicta sua propria velut oracula sacrarentur, sicut inepti principes nonnulli, adulatione corrupti, sibi fieri gestiunt. Attamen si recensere vellem pleraque ejus dicta (ut feci in Alexandro), sunt ea certe hujusmodi, qualia notat Sa-

other "nell' effetto." If his brother had inherited his popularity he might probably have been both.

[1] The intention of this work of Cæsar was probably to determine uncertain points of language by the analogy of cases which were free from doubt. In the *Origines* of Isidorus, i. c. 27., we find an account of what grammarians mean by analogy. The truth is, that though Bacon speaks of the work in question as if he were familiar with its contents, very little is known about them. [Compare vi. 1. in the 6th paragraph.]

[2] Plut. in Jul. Cæs. c. 54.; and Aulus Gellius, xiii. c. 9.

lomon, *Verba sapientum sunt tanquam aculei, et tanquam claiv in altum defixi.*[1] Itaque tria hic tantum proponam, non tam elegantia quam vi et efficacia mirabilia.

Primo igitur, magister sit oportet loquendi, qui unico verbo seditionem in exercitu comprimere potuit. Sic autem se res habuit. Romanis mos fuit, dum exercitum duces alloquerentur, Milites uti eos appellarent; cum magistratus populum, Quirites. Tumultuabantur milites Cæsaris, ac missionem seditiose flagitabant; non quod hoc ipsi cuperent, sed ut hoc postulato Cæsarem ad alias conditiones adigerent. Ille immotus atque inconcussus, silentio facto, sic exorsus est; *Ego, Quirites;* quo verbo eos jam dimissos significabat. Eo perculsi milites, et plane obstupefacti, concionantem deinceps perpetuo obturbabant, et postulato illo missionis posthabito, contra obnixe petebant ut Militum appellatio eis restitueretur.[2]

Secundum fuit hujusmodi. Regis nomen Cæsar summe affectabat. Itaque subornati sunt nonnulli, qui prætereuntem populari acclamatione Regem salutarent. Ille sentiens acclamationem tenuem fuisse ac raram, negotium joco transmisit, ac si erratum esset in cognomine, *Non Rex sum*, inquit, *sed Cæsar.*[3] Dictum sane hujusmodi, ut si diligenter excutiatur, vigor ejus et pondus vix exprimi possit. Primum enim recusationem nominis præ se ferebat, sed neutiquam seriam. Deinde ingentem quandam confidentiam et magnanimitatem monstrabat; ac si Cæsaris appellatio illustrior titulus esset quam Regis; quod haud secus evenit, et usque in hodiernum diem obtinuit. Sed quod illius maxime intererat, hoc dictum summo artificio finem suum urgebat. Hoc enim innuebat S. P. Q. R. de re levi, hoc est nomine tantum (nam potestatem regiam jampridem habebat), secum contendere; ac tali nomine, quale complures etiam ex familiis obscuris gerebant; nam cognomen Regis multis Romanorum gentilitium erat, quemadmodum et nos simile quiddam nostro idiomate habemus.

Ultimum quod hoc loco repetere placet, tale fuit. Cum Cæsar post bellum initum Romam occupasset, atque sanctius ærarium reclusisset, ut pecunias ibi congestas in usus belli tolleret, restitit Metellus, utpote tunc temporis Tribunus; cui Cæsar, *Si perstes*, inquit, *mortuus es.* Dein reprimens se pau-

[1] Eccles. xii. 11.

[2] Suetonius in Julio, c. 70., and conf. Appian *De Bellis Civilibus*, ii. c. 93.

[3] Suetonius, ub. sup. c. 79. App. ii. c. 108. The anecdote reminds one of the title *Rey Gomez*, which was given to Philip the Second's favourite *Ruy Gomez de Silva.*

lum, subjecit; *Adolescens, durius est mihi hoc dicere quam facere*[1]: dictum tam mirifice ex terrore et clementia conflatum, ut nihil supra.

Verum ut Cæsarem mittamus, perspicuum est eum probe sibi conscium suæ eximiæ eruditionis fuisse; ut liquet ex eo, quod demirantibus nonnullis Lucii Syllæ consilium in deponenda dictatura, cavillans dixit; *Sylla nescivit literas, dictare non potuit.*[2]

Nunc autem tempus videtur imponendi finem huic dissertationi de arcta conjunctione militaris virtutis et literariæ (quid enim in hoc genere post Alexandrum et Cæsarem afferri potest?) nisi quod moveor unius alterius exempli dignitate et insolentia, eo quod tam subito transierit a ludibrio ad miraculum. Est autem Xenophontis philosophi, qui e Socratis ludo profectus est in Asiam cum Cyro Juniore, in expeditione contra regem Artaxerxem. Hic Xenophon eo tempore peradolescens fuit, et nunquam aciem aut castra viderat, neque tunc præfecturam aliquam in exercitu gerebat, sed tantum sponte ob amicitiam Proxeni proficiscebatur. Aderat forte fortuna, cum Falinus a Magno Rege legatus ad Græcos veniret, postquam Cyrus in acie occubuisset, Græci autem (manipulus tantummodo hominum) duce orbati, in medio provinciarum Persiæ, a patria sua plurimorum milliarium intervallis et fluminibus maximis atque altissimis interclusi essent. Legatio huc spectabat, ut positis armis atque deditis se regiæ clementiæ submitterent. Cui legationi antequam publice responsum esset, complures ex exercitu familiariter cum Falino colloquebantur, inter quos Xenophon ita forte locutus est: *Imo,* inquit, *Faline, hæc duo tantum nobis jam supersunt, arma et virtus; si igitur arma dedamus, cui usui* (*obsecro*) *nobis erit virtus?* At Falinus subridens, *Ni fallor* (inquit) *Atheniensis es* (*adolescens*) *et philosophiæ incumbis, atque bellula sunt quæ dicis; sed valde erras, si virtutem vestram regiis copiis parem esse arbitreris.*[3] Ecce ludibrium; sequitur miraculum. Novitius iste ex schola, et philosophus, postquam omnes duces et præfecti proditione interempti essent, decem millia peditum Babylone in Græciam reduxit per medias Regis

[1] Plut. in Jul. c. 35. [2] Sueton. in Jul. c. 77.

[3] The story here referred to is told in the *Anabasis*, ii. 1. 12. But it seems clear that the remark to which Phalynus replies is incorrectly ascribed to Xenophon. Schneider replaces his name by that of Theopompus. Xenophon who then held no command in the Greek army could scarcely have been present at the conference between Phalynus and the generals, and the next sentence of his narrative implies that he only knew by report what had passed there.

provincias, omnibus ejus copiis frustra obnitentibus; quo facto stuporem injecit omnibus, Græcis autem ab eo tempore ingentes addidit animos et spiritus ad Persarum regnum invadendum et subvertendum. Quod et mox cogitavit sane et designavit Jason Thessalus; tentavit et inchoavit Agesilaus Spartanus; perfecit demum Alexander Macedo, omnes literati istius prævii egregio facinore incitati.

Pergamus ab imperatoria militarique virtute ad moralem, et eam quæ est hominum privatorum. Primo, certissimum est illud poetæ,

> Scilicet ingenuas didicisse fideliter artes
> Emollit mores, nec sinit esse feros.[1]

Eruditio siquidem humanas mentes feritate atque barbarie exuit. Veruntamen opus est, ut accentus sit in voce illa *Fideliter*. Nam tumultuaria cognitio flectit potius in contrarium. Eruditio, inquam, levitatem, temeritatem, atque insolentiam tollit; dum omnia pericula et ambigua simul cum re ipsa suggerit, rationum et argumentorum pondera in utramque partem librat, prima quæque quæ se offerunt animo eique arrident pro suspectis habet, iterque omne tanquam explorato inire docet. Eadem admirationem rerum vanam et nimiam evellit, radicem ipsam omnis infirmi consilii: quippe admiramur res, vel quia novæ sunt, vel quia magnæ. Quantum ad novitatem, nemo est qui literas et rerum contemplationem penitus imbiberit, quin illud cordi impressum habeat, *Nil novi super terram.*[2] Neque enim puparum ludum quisquam magnopere mirabitur, qui pone aulæa caput inserens organa quibus moventur et filamenta cernit. Quantum ad magnitudinem, quemadmodum Alexander Magnus ingentibus præliis et victoriis in Asia assuetus, cum interdum acciperet e Græcia literas de expeditionibus et dimicationibus quibusdam illic factis, quæ plerunque propter pontem aliquem aut castellum, aut ad summum pro expugnatione oppidi alicujus, suscipiebantur, dicere solebat, *Videri sibi nuncium allatum de ranarum et murium pugna, de qua Homerus*[3]*:* sic certe, qui universitatem rerum ejusque fabricam intueatur, illi terræ globus,

[1] Ovid, Ex. Pont. ii. 9. 47; but not quite accurately quoted. It has not perhaps been remarked that Ovid seems to have taken this gnome from Theophrastus: *δοκεῖ γὰρ ἡ παιδεία, καὶ τοῦτο πάντες ὁμολογοῦσι, ἡμεροῦν τὰς ψυχὰς, ἀφαιροῦσα τὸ θηριῶδες καὶ ἄγνωμον.* Theophrastus, in the additions to Stobæus, first published by Gaisford (p. 419. of his edition of the *Florilegium.*)

[2] "There is no new thing under the sun."—*Eccles.* i. 9.

[3] It was of an engagement between Antipater and Agis that Alexander spoke as a *μυομαχία.* It took place just after the battle of Arbela. Plut. in Agesil. c. 15.

cum hominibus superstantibus, (si divinitatem animarum seponas) haud majus quidpiam videbitur quam colliculus formicarum; quarum aliæ cum granis, aliæ cum ovis suis, aliæ vacuæ, omnes hinc inde circa exiguum pulvisculi acervum reptant et cursitant.[1] Porro eruditio aufert, aut saltem minuit, timorem mortis atque adversæ fortunæ, quo nihil magis virtutibus moribusque officere solet. Si enim animus cujuspiam contemplatione mortalitatis et rerum naturæ corruptibilis imbutus fuerit et intinctus, juxta cum Epicteto sentiet; qui, cum pridie exiens mulierculam ob fractam ollam plorantem cerneret, postridie etiam exiens aliam mortuum filium deflentem conspiceret, dixit: *Heri vidi fragilem frangi, hodie vidi mortalem mori.*[2] Quare optime et valde sapienter Virgilius cognitionem causarum cum metus omnis profligatione copulavit, tanquam concomitantia;

> Fœlix qui potuit rerum cognoscere causas,
> Quique metus omnes et inexorabile fatum
> Subjecit pedibus, strepitumque Acherontis avari.[3]

Nimis longum esset singula percurrere remedia, quæ singulis animi morbis doctrina suppeditat; aliquando vitiosos humores expurgans, nonnunquam obstructiones aperiens, alias concoctionem juvans, alias appetitum excitans, non raro vulnera ejus et ulcera sanans, et similia. Quare concludam cum hoc, quod videtur rationem habere totius; ita nimirum animum doctrinam disponere et flectere, ut nunquam protinus acquiescat et tanquam congeletur in defectibus suis, quin incitet se semper progressumque spiret. Nescit illiteratus quid sit in se descendere aut secum inire rationes, aut quam suavis vita sit quæ indies sentit se fieri meliorem[4]; si qua forte virtute præditus sit, eam

[1] "Formicarum iste discursus est in angusto laborantium."—*Seneca, Quæst. Nat.* i. in præf.

[2] See Epictetus's *Enchiridion*, chapters 8. and 33. for the idea which is here presented, I know not on what authority, in a dramatic form. It was probably familiar to the minds of the later Stoics. Compare Plutarch, *Consol. ad Apoll.*

[3] Georgics, ii. 490.

[4] [In the *Advancement of Learning* this sentence is given in Latin, as if it were a quotation: "Suavissima vita indies sentire se fieri meliorem." In the *Promus* it is given in a form slightly different: "Suavissima vita indies meliorem fieri."] Dante alludes to this gnome,—

> "E come, per sentir più dilettanza,
> Bene operando l'uom, di giorno in giorno
> S'accorge che la sua virtute avanza, &c. *Parad.* xviii. 58.

It comes originally from the *Memorabilia*: [though not in so sententious a shape. καὶ μὴν τοῦτό γε οἶσθα ὅτι οἱ μὲν οἰόμενοι μηδὲν εὖ πράττειν οὐκ εὐφραίνονται, οἱ δὲ ἡγούμενοι καλῶς προχωρεῖν ἑαυτοῖς ἢ γεωργίαν ἢ ναυκληρίαν ἢ ἄλλ' ὅ, τι ἂν τυγχάνωσιν ἐργαζόμενοι ὡς εὖ πράττοντες εὐφραίνονται; οἴει οὖν ἀπὸ πάντων τούτων τοσαύτην ἡδονὴν εἶναι ὅσην ἀπὸ τοῦ ἑαυτόν τε ἡγεῖσθαι βελτίω γένεσθαι, καὶ φίλους ἀμείνους κτᾶσθαι; Ἐγὼ τοίνυν διατελῶ ταῦτα νομίζων. — Xen. Mem. i. 6.]

venditabit scilicet, et ubique spectandam exponet, eaque utetur forsitan commode, quam tamen excolere et augere negligit. Rursus, si quo vitio laborat, artem atque industriam illud celandi atque occultandi, minime autem corrigendi, adhibebit; tanquam malus messor, qui perpetuo demetit, falcem autem nunquam exacuit. Literatus contra non tantum utitur animo virtutesque exercet, sed continuo emendat se et in virtutem proficit. Imo, ut in summa dicam, pro certo est veritatem et bonitatem distingui tantum sicut sigillum et impressionem; nam veritas bonitatem signat; et contra, vitiorum ac perturbationum procellæ ex erroris et falsitatis nubibus erumpunt.[1]

A virtute transeamus ad potentiam et imperium; et dispiciamus, si uspiam inveniatur tanta potentia et regnum, quanto eruditio hominis naturam investit et coronat. Videmus dignitatem imperandi sequi dignitatem ejus cui imperatur. Imperium in belluas et pecora, quale bubulcorum aut opilionum, res vilis; imperium in pueros, quale ludimagistrorum, minus honorificum; imperium in mancipia potius dedecori est quam honori; neque multo præstantius est imperium tyrannorum in populum servilem atque animis et generosa indole exutum. Unde hoc semper manavit judicium, honores in liberis monarchiis aut rebuspublicis suaviores esse quam sub tyrannis, quia imperium honorificum magis supra volentes est, quam supra invitos et coactos. Ideoque Virgilius, cum ex intimo artificio inter humanos honores longe vellet optimos expromere, quos Augusto Cæsari assignaret, in hæc ipsa verba loquitur;

Victorque volentes
Per populos dat jura, viamque affectat Olympo.[2]

Ast imperium scientiæ longe celsius est quam imperium in voluntatem, licet liberam et non astrictam. Illa enim rationi, fidei, et intellectui ipsi dominatur, qui est altissima pars animi et voluntatem ipsam regit. Etenim nulla proculdubio terrena est potestas quæ in spiritibus hominum et animalibus, eorumque cogitationibus et phantasiis, assensu quoque et fide, thronum et quasi cathedram suam erigit et collocat, præter doctrinam et scientiam. Ac idcirco videmus detestabilem illam et immensam delectationem, qua hæresiarchæ, falsi prophetæ, et impostores magni perfunduntur et rapiuntur, postquam sense-

[1] [The original edition has *erumperunt*: a misprint which is corrected in Rawley's edition, 1638.] See on the relation between veritas and bonitas, S. Thomas, *Sum. Theolog.* i. q. 16.

[2] Georg. iv. 561

rint in fide et conscientiis hominum cœpisse se regnare; tantam certe, ut qui eam semel degustaverit nullis fere persecutionibus aut tormentis adigi possit ut hoc regno se abdicet. Sicut autem hoc illud est, quod in Apocalypsi dicitur *abyssus sive profunda Sathanæ*[1]; ita e contrario justus et legitimus in animos hominum dominatus, veritatis ipsa evidentia ac commendatione dulcissima stabilitus, sane quam proxime ad potestatis divinæ similitudinem accedit.

Quod ad fortunas et honores spectat, munificentia doctrinæ non sic regna integra et respublicas locupletat et ditat, ut non hominum etiam privatorum fortunas et opes amplificet et evehat. Vetus enim observatio est, Homerum pluribus suppeditasse victum quam Syllam, Cæsarem, aut Augustum; licet tot congiaria, tot donativa, tot agrorum assignationes largiti sint. Certe difficile dictu est, arma an literæ plurium fortunas constituerint. Quin si de summa potestate loquamur, videmus, si arma aut jus hæreditatis Regnum contulerunt, at literarum sorti sæpius cessit Sacerdotium, quod regni semper fuit rivale.[2]

Rursus, si delectationem jucunditatemque scientiæ intuearis, multum sane illa voluptates alias omnes exuperat. Quid enim? Num forte affectuum voluptates tanto intervallo oblectamenta sensuum excedent, quanto voti assecutio fœlix cantiunculam aut cœnam; et non pari gradatione intellectus voluptates eas quæ sunt affectuum transcendent? In cæteris oblectationibus satietas est finitima, et postquam paulo inveteraverint, flos ipsarum et venustas marcescit; quo docemur, non illas liquidas revera voluptates ac sinceras fuisse, sed umbras tantum et fallacias voluptatum, non tam qualitate sua quam novitate jucundas. Unde et voluptarii sæpius fiunt monachi, et ambitiosorum principum senectus tristior fere est et melancholia obsessa. Scientiæ autem non est satietas, verum et fruendi et appetendi perpetua et subinde recurrens vicissitudo; ut necesse sit hujus delectationis bonum simplex esse, non ex accidente, aut cum fraude. Neque illa voluptas, quam depingit Lucretius, ultimum in animo locum sortitur,

Suave mari magno, turbantibus æquora ventis, &c.[3]

[1] Rev. ii. 24.

[2] Campanella says somewhere: "To Japhet belong law and empire; Shem has the priesthood; Ham is the tyrant and the slave." I regret that I cannot give a precise reference to this striking remark.

[3] De Nat. Rer. ii. 1.

Suave est spectaculum (inquit) *stantem aut ambulantem in littore, navem intueri tempestate in mari jactatam: suave itidem ex edita turri duas cernere acies concursantes in planitie; at nil dulcius est homini, quam mens per doctrinam in arce veritatis collocata, unde aliorum errores et labores dispicere possit.*

Denique, ut mittamus vulgaria illa argumenta, quod per doctrinam scilicet *homo homini in eo præstet, in quo ipse brutis;* quod ope doctrinæ ascendat homo intellectu usque ad cœlos, quo corpore non potest; et alia similia; cum eo concludamus bono hanc dissertationem de literarum excellentia, ad quod humana natura ante omnia aspirat, hoc est, immortalitate et æternitate. Huc enim spectant procreatio sobolis, nobilitatio familiæ, ædificia, fundationes, monumenta, fama, ac denique humanorum votorum summa. Atqui videmus monumenta ingenii et eruditionis quanto diutius durent quam ea quæ opere et manu facta sunt. Annon Homeri carmina viginti quinque annorum centurias, et supra, absque unius syllabæ aut literæ jactura duraverunt? Quo spatio innumera palatia, templa, castella, urbes, collapsa sunt aut diruta. Picturæ ac statuæ Cyri, Alexandri, Cæsaris, imo regum et principum multo recentiorum, nullo jam sunt modo parabiles; archetypa enim ipsa jamdudum confecta vetustate perierunt, exempla autem indies primigenia similitudine mulctantur. At ingeniorum imagines perpetuo integræ manent in libris, nullis temporum injuriis obnoxiæ, utpote quæ jugem renovationem recipere possunt; quanquam nec imagines dici proprie possint, quia perpetuo generant quodammodo, seminaque sua in animos hominum spargunt, atque ætatibus subsequentibus infinitas actiones opinionesque suscitant et progignunt. Quod si navis inventum res existimata tam nobilis et admirabilis fuerit, quæ opes mercesque hinc inde transportat, regiones locis disjunctissimas participatione fructuum et commodorum consociat; quanto rectius literæ celebrari debent, quæ, tanquam naves sulcantes oceanum temporis, remotissima sæcula ingeniorum et inventorum commercio et societate copulant? Porro videmus nonnullos philosophorum qui maxime immersi erant sensibus minimeque divini, atque immortalitatem animæ præfracte negabant; hoc tamen vi veritatis adactos concessisse, quoscunque motus et actus anima humana absque corporis organo præstare possit, eos etiam post mortem permanere probabile esse; quales nimirum erant intellectus, minime autem affectuum motus. Adeo scilicet scientia

immortalis visa est res illis, atque incorruptibilis.[1] Nos autem quibus divina revelatio illuxit, conculcantes hæc rudimenta atque offucias sensuum, novimus non solum mentem, sed et affectus perpurgatos, neque animam tantum, sed etiam corpus ad immortalitatem assumptum iri suo tempore. Sedenim meminerint homines, et nunc et alias ubi opus fuit, me in probationibus de dignitate scientiæ inde ab initio sejunxisse testimonia divina ab humanis; quam methodum constanter retinui, separatim utrunque explicans.

Quamvis vero hæc ita sint, nequaquam tamen hoc mihi sumo, neque me consequi posse confido, ut ulla causæ hujus pro doctrina peroratione aut actione judicia rescindam, vel *Æsopici galli*, qui granum hordei gemmæ prætulit; vel *Midæ*, qui cum arbiter factus esset inter Apollinem Musarum, et Panem ovium præsidem, opulentiæ palmam detulit; vel *Paridis*, qui spreta sapientia ac potentia primas voluptati et amori dedit; vel *Agrippinæ*, eligentis, *Occidat matrem modo imperet*[2], imperium licet cum conditione detestanda præoptantis; vel *Ulyssis, qui vetulam prætulit immortalitati*, typi certe eorum qui consueta optimis præponunt; plurimaque ejusmodi judicia popularia.

Hæc enim antiquum obtinebunt: verum et illud
etiam manebit, cui innixa est semper doctrina
tanquam firmissimo fundamento, quodque
nunquam labefactari poterit,
Justificata est Sapientia
a filiis suis.[3]

[1] The doctrine of the soul's immortality here referred to is that which was attributed to Aristotle and his followers, who are here contrasted with the Platonists, as being more "immersed in the senses." What Aristotle's opinion as to the immortality of the soul really was, is a question which when his philosophy began to be studied independently of the scholastic theology attracted great attention. I may refer particularly to the celebrated work of Pomponatius. In common with others who in his day professed themselves followers of the genuine Aristotelian philosophy, he obtained, perhaps not undeservedly, the reputation of holding irreligious opinions on this and on other questions. It is well known that about the same time a school of Platonists was ormed, whose opinions, so far at least as related to natural religion, were favourably contrasted with those of the Aristotelians. Beside Pomponatius, the *Quæst. Peripat.* of Cæsalpinus, li. c. 8., may be referred to.

[2] "Occidat dum imperet."— *Tac. Ann.* xiv. 9.

[3] S. Matt. xi. 10.

FRANCISCI BARONIS DE VERULAMIO,

VICE-COMITIS SANCTI ALBANI,

DE DIGNITATE ET AUGMENTIS SCIENTIARUM

LIBER SECUNDUS.

AD REGEM SUUM.[1]

CONSENTANEUM videri possit, tametsi non raro secus eveniat, (Rex optime) ut qui sobole numerosa aucti sunt, quique immortalitatem suam in posteris ipsorum quasi prospectant, præ cæteris mortalibus sint solliciti de statu futurorum temporum; utpote quibus satis intelligunt charissima illa sua tandem debere pignora transmitti. Elizabetha regina, propter vitam cœlibem, hospes potius in mundo quam incola fuit; sua quidem tempora ornavit, et in multis beavit. Enimvero tuæ Majestati (cui Deus pro benignitate sua dedit tot suscipere liberos, dignos certe qui te perpetuent, cujusque ætas vigens et thorus fœcundus adhuc plures pollicetur)[2] usquequaque convenit non modo tuum (quod facis) sæculum irradiare, verum etiam ad illa curas tuas extendere quæ memoria omnis alat quæque ipsa intueatur æternitas. Inter ea autem (nisi studium meum erga literas me fallit) nil dignius est aut nobilius quam si dotetur orbis terrarum *Augmentis Scientiarum* solidis et fructuosis. Quousque enim tandem pauculos aliquos scriptores statuemus nobis tanquam Columnas Herculis, ne *plus ultra* in doctrinis progrediamur; cum habeamus Majestatem tuam instar lucidi et benigni syderis, quod nos inter navigandum conducat et fortunet?

Ut igitur ad rem redeamus: Recolamus jam et nobiscum perpendamus quid principes viri aliique huc usque ad literarum amplificationem attulerint, quid prætermiserint? Hoc autem

[1] Here the first part of the *Instauratio Magna*, the *Partitiones Scientiarum*, properly begins; the nine following pages being the preface.—*J. S.*

[2] This passage, being translated from the *Advancement of Learning*, must be considered of course as written in 1605.—*J. S.*

presse et distincte excutiamus sermone quodam activo et masculo, nusquam digrediendo, nil amplificando. Ponatur igitur illud (quod quivis concedat) opera quæque maxima et difficillima vel præmiorum amplitudine, vel consiliorum prudentia et sanitate, vel laborum conjunctione superari; quorum primum conatum extimulat, secundum ambages et errores tollit, tertium mortalium fragilitati succurrit. At inter hæc tria merito primas tenet *consilii prudentia et sanitas;* hoc est, monstratio et delineatio viæ rectæ et proclivis ad rem quæ proponit peragendam: *Claudus enim* (quod dici solet) *in via antevertit cursorem extra viam.* Et Salomon, perapposite ad hanc rem; *Ferrum si retusum fuerit, viribus utendum majoribus; quod vero super omnia prævalet est sapientia.*[1] Quibus verbis innuit, medii prudentem electionem efficacius conducere ad rem, quam virium aut intentionem aut accumulationem. Hæc ut dicam illud impellit, quod (salvo semper eorum honore qui de literis quomodocunque meruerunt) perspicio atque animadverto opera eorum atque acta pleraque ad magnificentiam potius et nominis sui memoriam quam ad scientiarum ipsarum profectum et augmenta spectasse, et literatorum potius numerum auxisse quam artibus ipsis multum incrementi attulisse.

Actiones autem et opera quæ ad literas amplificandas pertinent circa tria versantur objecta: circa literarum Sedes; circa Libros; et circa Personas eruditorum. Quemadmodum enim aqua, sive ex cœlesti rore descendens sive ex fontibus scaturiens, facile dispergitur et disperditur, nisi colligatur in aliqua receptacula, ubi per unionem et congregationem se sustentare et fovere possit, (quem in finem excogitavit solertia humana aquæductus, cisternas, stagna; eaque etiam variis ornamentis condecoravit, quæ magnificentiæ et dignitati non minus quam usui et necessitati deserviant,) similiter liquor iste scientiæ pretiosissimus, sive a divina inspiratione destillet sive e sensibus exiliat, mox periret omnis atque evanesceret, nisi conservaretur in libris, traditionibus, colloquiis; ac præcipue in locis certis his rebus destinatis, quales sunt Academiæ, Collegia, Scholæ; ubi et permanentes habeat sedes, et crescendi insuper et se congregandi copiam et facultatem.

Ac primo, opera quæ ad *Musarum Sedes* spectant quatuor numerantur; Edificiorum structura, Proventuum dotatio, Pri-

[1] Eccles. x. 10.

vilegiorum concessio, Disciplinæ lex et institutio; quæ omnia ad secessum et otium (ut plurimum) conferunt, et ad vacationem a curis et molestiis: qualia sunt quæ ad alvearia constituenda in usum mellis requirit Virgilius;

> Principio sedes apibus statioque petenda,
> Quo neque sit ventis aditus, &c.[1]

At opera circa *libros* duo sunt præcipua: primum bibliothecæ, in quibus, tanquam mausolæis, priscorum sanctorum reliquiæ, virtutis plenæ, conditæ sunt; secundo, novæ editiones authorum, emendatioribus impressionibus, fidelioribus versionibus, utilioribus commentariis, annotationibus magis diligentibus, et hujusmodi famulitio, instructæ et ornatæ.

Porro opera quæ *literatorum hominum personas* respiciunt (præterquam quod ipsi ornandi sint et promovendi) sunt etiam duo: remuneratio et designatio Lectorum in artibus jamdudum inventis et cognitis; et remuneratio ac designatio Scriptorum circa eas doctrinæ partes quæ non satis hactenus excultæ aut elaboratæ sunt.

Hæc summatim opera sunt et acta, in quibus inclytorum principum aliorumque illustrium virorum promerita erga rem literariam claruerunt. De particulari alicujus commemoratione qui de literis bene meruit cogitanti, occurrit illud Ciceronis, quod eum post reditum suum ad gratias promiscue agendas impulit; *Difficile non aliquem, ingratum quenquam præterire.*[2] Potius (ex Scripturarum consilio) spatium intueamur quod adhuc restat in stadio decurrendum, quam oculos reflectamus ad ea quæ a tergo jampridem reliquimus.

Primum igitur, inter tot totius Europæ collegia præclarissime fundata, omnia illa certis professionibus destinata esse demiror, nulla liberis atque universalibus artium et scientiarum studiis dedicata. Nam si quis judicet doctrinam omnem referendam esse ad usum et actionem, recte sapit; veruntamen facile est isto modo prolabi in errorem illum quem fabula perantiqua perstringit; in qua cætera corporis membra litem ventriculo intenderunt, quod neque motum præberet ut artus, neque sensum ut caput; quamvis interea alimentum coctum atque confectum ventriculus ille in reliquum corpus divideret. Plane eodem modo, qui in philosophia ac contemplationibus univer-

[1] Georg. iv. 8.
[2] "Difficile est non aliquem, nefas quenquam præterire." — *Cicero, Post Red.* c. 12.

salibus positum omne studium inane atque ignavum arbitratur, non animadvertit singulis professionibus et artibus exinde succum et robur suppeditari. Atque certe persuasum habeo, hanc ipsam haud minimam causam fuisse cur fœlicior doctrinæ progressus huc usque retardatus sit; quod opera hisce fundamentalibus scientiis navata sit tantum in transitu, neque haustus pleniores inde epoti. Nam si arborem solito fructuosiorem fieri cupias, de ramis medicandis frustra cogitaveris; terra ipsa circa radicem subigenda et gleba lætior admovenda, aut nihil egeris. Neque rursus silentio prætermittendum est, hanc collegiorum et societatum in usum tantummodo doctrinæ professoriæ dedicationem non solum scientiarum incrementis inimicam fuisse, sed etiam in regnorum et rerumpublicarum detrimentum cessisse. Hinc enim fieri solet ut principes, delectum habituri ministrorum qui rebus civilibus tractandis sint idonei, ejusmodi hominum miram solitudinem circa se reperiant; propterea quod non habeatur educatio aliqua collegiata in hos usus destinata, ubi scilicet homines a natura ad hoc facti et comparati, (præter artes alias) historiæ, linguis modernis, libris et tractatibus politicis, præcipue incumbant; ut inde ad civilia munera magis habiles et instructi accedant.

Quoniam vero fundatores collegiorum *plantant*, prælectionum vero *rigant;* sequitur jam ordine, ut dicam quid in publicis lectionibus desideretur. Nimirum improbo vel maxime tenuitatem stipendiorum, prælectoribus sive artium sive professionum (præsertim apud nos) assignatam. Interest enim inprimis progressus in scientiis, ut lectores in unoquoque genere ex optimis instructissimisque eligantur; utpote quorum opera non in usum transitorium, sed ad sufficiendam sobolem scientiæ in sæcula adhibeatur. Id fieri nequit, nisi præmia et conditiones tales constituantur quibus eminentissimus quisque in ea arte plane contentus esse possit; ut illi demum grave non sit in eodem munere immori, neque practicam cogitet. Quocirca scientiæ ut floreant, militaris lex servanda Davidis; *ut æqua esset pars descendentis ad prælium et manentis ad sarcinas*[1]; sarcinis male aliter prospectum erit. Sic lectores in scientiis sunt tanquam conservatores et custodes totius literarii apparatus unde praxis et militia deinceps scientiarum instruatur; proinde æquum est

[1] 1 Sam. xxx. 24. Similarly it was provided by the laws of Alfonso the Wise, in accordance with earlier usage, that no divison of spoil should be made until those in pursuit of the enemy had returned to the camp. See the *Siete Partidas*, ii. 26. 1.

ut merces ipsorum lucra practicorum exæquare possit. Aliter si patribus scientiarum præmia non constituantur satis ampla et luculenta, eveniet illud,

Et patrum invalidi referent jejunia nati.[1]

Defectum nunc notabo alium, in quo alchymista quispiam in auxilium advocandus foret; cum id genus hominum studiosis authores sint, ut libros vendant, fornaces exstruant, Minervam ac Musas (tanquam virgines steriles) deserant, ac Vulcano se applicent. Fatendum est enimvero tam ad penetralia contemplationis quam ad operativæ fructum in nonnullis scientiis (præsertim Naturali Philosophia et Medicina) haud unica subsidia e libris petenda esse. Qua in re neutiquam omnino cessavit munificentia hominum; quippe videmus non libros magis quam sphæras, globos, astrolabia, mappas, et alia similia, ut adminicula quædam astronomiæ et cosmographiæ comparari et studio præberi. Videmus etiam loca nonnulla, Medicinæ studio dicata, hortos habere pro simplicium cujusque generis inspectione et notitia; nec usu mortuorum corporum ad observationes anatomicas destitui. Cæterum hæc ad pauca spectant. In genere, pro certo habeatur, magnos in rebus naturæ abditis eruendis et reserandis progressus vix fieri posse, nisi ad experimenta, sive Vulcani sive Dædali (fornacis scilicet aut machinæ) vel cujuscunque alterius generis, sumptus abunde suppeditentur. Ideoque sicut principum secretariis et emissariis conceditur exhibere rationes expensarum pro diligentiis suis in explorando et eruendo res novas et arcana civilia; similiter et exploratoribus ac speculatoribus Naturæ satisfaciendum de expensis suis; alias de quamplurimis scitu dignissimis nunquam fiemus certiores. Si enim Alexander magnam vim pecuniæ suppeditavit Aristoteli, qua conduceret venatores, aucupes, piscatores, et alios, quo instructior accederet ad conscribendam historiam Animalium; certe majus quiddam debetur iis, qui non in saltibus naturæ pererrant, sed in labyrinthis artium viam sibi aperiunt.

Defectus etiamnum alius nobis observandus (magni certe momenti), neglectus quidam est, in academiarum rectoribus, consultationis; in regibus sive superioribus, visitationis; in hunc finem, ut diligenter consideretur et perpendatur, utrum prælectiones, disputationes, aliaque exercitia scholastica antiquitus instituta et ad nostra usque tempora usitata, continuare

[1] Georg. iii. 128.

fuerit ex usu, vel potius antiquare, aliaque meliora substituere. Etenim inter Majestatis tuæ canones prudentissimos illum reperio; *In omni vel consuetudine vel exemplo, tempora spectanda sunt quando primum res cœpta; in quibus si vel confusio regnaverit vel inscitia, derogat illud in primis authoritati rerum, atque omnia reddit suspecta.* Quamobrem, quandoquidem academiarum instituta plerunque originem traxerint a temporibus hisce nostris haud paulo obscurioribus et indoctioribus, eo magis convenit ut examini denuo subjiciantur. Exemplum in hoc genere unum aut alterum proponam in rebus quæ maxime obviæ videntur et familiares. Pro more receptum est (licet, uti mihi videtur, perperam) ut literarum studiosi Logicam et Rhetoricam præpropere nimis addiscant, artes sane provectioribus magis convenientes quam pueris et tyronibus. Etenim hæ duæ, si vere res perpendatur, sunt ex artibus gravissimis; cum sint *Artes Artium*, altera ad judicium, altera ad ornatum. Quinetiam regulam et normam continent, res et materiam subjectam vel disponendi vel illustrandi. Ideoque id agere, ut mentes rerum ignaræ et rudes, (quæque nondum id collegerunt quod a Cicerone *Sylva*[1] vel *Supellex*[2] appellatur, id est materiem et copiam rerum,) initium ab istis scientiis sumant, (ac si quis discere vellet ponderare vel metiri vel ornare ventum,) haud aliud profecto parit, quam ut harum artium virtus et facultas (quæ permagnæ sunt et latissime diffusæ) fere contemptæ jaceant; atque vel in puerilia sophismata affectationesque ridiculas degeneraverint, vel saltem existimatione sua haud parum mulctatæ sint. Quinetiam præmatura et intempestiva ad has artes accessio dilutam earum atque jejunam traditionem ac tractationem necessario secum traxit, qualis nimirum captui puerorum adaptetur. Alterum exemplum (quod adducam) erroris, qui in academiis jamdiu inveteravit, ejusmodi est; quod scilicet inventionis atque memoriæ in exercitiis scholasticis fieri solet nimio plus noxium divortium. Illic siquidem orationes pleræque aut omnino præmeditatæ sunt, adeo ut conceptis verbis proferantur et inventioni nihil relinquatur; aut plane extemporariæ, ut perparum relinquatur memoriæ; (cum in vita communi et praxi rarus sit alterutrius istorum usus seorsim, sed potius mixturæ ipsorum; id est notarum sive commentariorum, atque dictionis subitæ;) ita ut hoc pacto exercitia ad praxim haud sint accommodata, nec imago respondeat vitæ. Illud autem in exercitiis perpetuo

[1] De Orator. iii. 26. [2] Orator, c. 24.

tenendum est; ut omnia (quam fieri potest) maxime repræsentent ea, quæ in vita agi solent; alioqui motus et facultates mentis pervertent, non præparabunt. Hujus autem rei veritas non obscure cernitur, cum academici ad praxim suarum professionum vel alia civilis vitæ munia se accingant; quod cum faciunt, hunc de quo loquimur defectum ipsi in se cito deprehendunt; sed citius etiamnum alii. Cæterum hanc partem, de institutorum academicorum emendatione, clausula illa (ex Cæsaris quadam ad Oppium et Balbum epistola desumpta) concludam: *Hoc quemadmodum fieri possit, nonnulla mihi in mentem veniunt, et multa reperiri possunt; de iis rebus rogo vos, ut cogitationem suscipiatis.*[1]

Alter defectus quem observo, altius paulo quam præcedens ascendit. Quemadmodum enim doctrinarum progressio haud parum in prudenti regimine et institutione academiarum singularum consistit; ita magnus ad hoc cumulus accedere possit, si academiæ universæ per totam Europam sparsæ arctiorem conjunctionem et necessitudinem contraherent. Sunt enim, uti videmus, multi ordines et sodalitia, quæ licet regnis et spatiis longinquis disjuncta sint, tamen societatem et tanquam fraternitatem inter se ineunt et colunt; adeo ut habeant præfectos (alios Provinciales, alios Generales) quibus omnes parent. Et certe, quemadmodum natura creat fraternitatem in familiis; artes mechanicæ contrahunt fraternitatem in sodalitiis; unctio divina superinducit fraternitatem in regibus et episcopis; vota et regulæ conciliant fraternitatem in ordinibus; eodem modo fieri non potest, quin intercedat fraternitas illustris et generosa inter homines per doctrinas et illuminationes, quandoquidem Deus ipse *Pater Luminum*[2] nuncupetur.

Postremo illud queror (de quo superius nonnihil præmisi) quod vel nunquam, vel raro admodum, publica aliqua extiterit designatio virorum idoneorum, qui vel scriberent vel inquisitionem instituerent de illis scientiarum partibus in quibus satis adhuc non fuerit elaboratum. Cui rei illud inserviet quam maxime, si tanquam lustrum condatur doctrinarum; et census excipiatur, quæ ex illis locupletes sint et majorem in

[1] Cic. Ep. ad Att. ix. 8. One of the earliest tracts on the subject of university reform is doubtless that which Peter Ramus (see his *Scholæ*. Basil. 1569, p. 1063.) addressed to Charles the Ninth. It relates chiefly to the expenses arising from fees, &c., to the neglect of the civil law which had always been coldly regarded at Paris, and to the trifling manner in which the scholastic disputations were conducted.

[2] S. James, i. 17.

modum auctæ, quæ autem inopes et destitutæ. Opinio enim copiæ inter causas inopiæ est; atque multitudo librorum luxuriæ potius quam penuriæ indicium quoddam præ se fert. Quæ tamen redundantia (si quis recte judicet) neutiquam delendis antehac scriptis libris, sed novis melioribus edendis, tolli debet; qui ejus generis sint ut, tanquam *serpens Mosis, serpentes Magorum* devorent.[1]

Horum quos enumeravimus omnium defectuum remedia, præter illius postremi; quinetiam ejusdem postremi, quoad partem ejus activam, quæ spectat ad designationem scribentium; opera sunt vere basilica; erga quæ privati alicujus conatus et industria fere sic se habeat ut Mercurius in bivio; qui digitum potest in viam intendere, pedem inferre non potest. At speculativa illa pars, quæ ad examen doctrinarum (quid nimirum in singulis desideretur) pertinet, etiam industriæ hominis privati patet. Mihi igitur in animo est perambulationem doctrinarum et lustrationem generalem et fidelem aggredi, præcipue cum inquisitione sedula et accurata quænam earum partes neglectæ incultæque jaceant, hominum industria nondum subactæ et ad usum conversæ; ut hujusmodi delineatio et registratio et publicis designationibus et privatorum spontaneis laboribus facem accendat. In quo nihilominus consilium est hoc tempore, omissiones duntaxat et *Desiderata* notare; non autem errores et infœlicitates redarguere. Aliud enim est inculta loca indicare, aliud culturæ modum corrigere.

Quam quidem ad rem cum me comparo et accingor, non sum nescius quantum opus moveam, quamque difficilem provinciam sustineam; etiam quam sint vires minime voluntati pares. Attamen magnam in spem venio, si ardentior meus erga literas amor me longius provexerit, usurum me excusatione affectus; quia non simul cuiquam conceditur *amare et sapere.*[2] Nescius equidem non sum eandem judicii libertatem aliis relinquendam, quam ipse usurpaverim. Equidem libenter æque acceperim ab aliis ac impertiverim humanitatis illud officium, *nam qui erranti comiter monstrat viam*[3], &c. Prospicio etiam animo complura ex illis quæ tanquam omissa et desiderata in registrum hoc nostrum referre visum fuerit, in diversas censuras incursura; alia scilicet quod sint dudum peracta, et jam extent;

[1] Not the serpent of Moses, but Aaron's. Ex. vii. 12.
[2] "Amare et sapere vix Deo conceditur."—*Senecæ Proverbia.*
[3] Ennius ap. Aul. Gell. xii. 4.

alia quod curiositatem sapiant, et fructum promittant perexilem; alia quod nimis ardua existant, et fere impossibilia quæ ab hominibus absolvantur. Ad priora duo quod attinet, res ipsæ pro se causam agent. Circa postremum de impossibilitate ita statuo: ea omnia possibilia et præstabilia censenda, quæ ab aliquibus perfici possint, licet non a quibusvis; et quæ a multis conjunctim, licet non ab uno; et quæ in successione sæculorum, licet non eodem ævo; et denique quæ publica cura et sumptu, licet non opibus et industria singulorum. Si quis tamen sit, qui malit Salomonis illud usurpare, *Dicit piger, Leo est in via*[1]; quam illud Virgilii, *Possunt, quia posse videntur*[2]; satis mihi erit si labores mei inter vota tantum sive optata melioris notæ habeantur. Sicut enim haud omnino rei imperitum esse oportet, qui quæstionem apposite instituat; ita nec sensus inops videatur, qui haudquaquam absurda optaverit.[3]

[1] Prov. xxvi. 13. [2] Æn. v. 231.

[3] It may be convenient in this place to warn the reader that although in editing this treatise I have followed the text of the original edition as exactly as I could, and altered no word without notice except in case of errors obviously accidental, I have nevertheless not attempted to preserve the original typographical arrangement; which is not to be regarded as Bacon's own. The task of carrying the book through the press appears to have been left to Dr. Rawley, whose taste (or that of the printer whom he employed) has betrayed him into so prodigal a use of the limited resources at his disposal for marking emphasis and regulating punctuation, that the marks have lost all their significance. Such is the profusion of commas, colons, and semicolons, that the larger divisions are confounded with the smaller; so many words are emphasized by italics that all distinctions of emphasis disappear. It is true, no doubt, that the habit of writing with a view to circulation in manuscript (which admits of a much greater variety of modifications and can be made much more expressive to the eye than printing) encouraged in those days a style of composition which depended in some degree for perspicuity on helps of this kind. And if, according to the practice of the best modern writers, who generally contrive that the structure of each sentence shall make the emphasis fall inevitably upon the emphatic word, I had dispensed with italics altogether, the meaning would probably, in some places, have been rendered obscure or even ambiguous. I have therefore endeavoured to make a compromise between the former and the present practice, distinguishing many of the words which are italicised in the original only by capital initials, removing the distinction altogether from many others, and reserving the italics for those which seem meant to be conspicuous; — and for quotations, which are so distinguished in all the writings of that period, whether printed or manuscript. — *J. S.*

CAPUT I.

Partitio universalis Doctrinæ Humanæ in Historiam, Poësim, Philosophiam; *secundum tres Intellectus facultates,* Memoriam, Phantasiam, Rationem: *quodque eadem partitio competat etiam* Theologicis.

Partitio Doctrinæ Humanæ ea est verissima, quæ sumitur ex triplici facultate Animæ Rationalis, quæ doctrinæ sedes est. Historia ad Memoriam refertur; Poësis ad Phantasiam; Philosophia ad Rationem. Per Poësim autem hoc loco intelligimus non aliud quam historiam confictam, sive fabulas. Carmen enim stili quidam character est, atque ad artificia orationis pertinet; de quo suo loco.

Historia proprie individuorum est, quæ circumscribuntur loco et tempore. Etsi enim Historia Naturalis circa species versari videatur, tamen hoc fit ob promiscuam rerum naturalium (in plurimis) sub una specie similitudinem; ut si unam noris omnes noris. Sicubi autem individua reperiantur, quæ aut unica sunt in sua specie, veluti sol et luna; aut a specie insigniter deflectunt, ut monstra; non minus recte constituitur narratio de illis in Historia Naturali, quam de hominibus singularibus in Historia Civili. Hæc autem omnia ad *Memoriam* spectant.

Poësis, eo sensu quo dictum est, etiam individuorum est, confictorum ad similitudinem illorum quæ in historia vera memorantur; ita tamen ut modum sæpius excedat, et quæ in rerum natura nunquam conventura aut eventura fuissent ad libitum componat et introducat; quemadmodum facit et Pictoria. Quod quidem *Phantasiæ* opus est.

Philosophia individua dimittit, neque impressiones primas individuorum sed notiones ab illis abstractas complectitur; atque in iis componendis et dividendis ex lege naturæ et rerum ipsarum evidentia versatur. Atque hoc prorsus officium est atque opificium *Rationis.*

Hæc autem ita se habere, si quis intellectualium origines petat, facile cernet. Individua sola sensum percellunt, qui intellectus janua est. Individuorum eorum imagines, sive impressiones a sensu exceptæ, figuntur in memoria, atque abeunt

in eam a principio tanquam integræ, eodem quo occurrunt modo. Eas postea recolit et ruminat anima humana; quas deinceps aut simpliciter recenset; aut lusu quodam imitatur; aut componendo et dividendo digerit. Itaque liquido constat ex tribus his fontibus, *Memoriæ*, *Phantasiæ*, et *Rationis*, esse tres illas emanationes *Historiæ*, *Poeseos*, et *Philosophiæ*; nec alias aut plures esse posse. Etenim historiam et experientiam pro eadem re habemus, quemadmodum etiam philosophiam et scientias.

Neque alia censemus ad Theologica partitione opus esse. Differunt certe informationes oraculi et sensus, et re et modo insinuandi; sed spiritus humanus unus est, ejusque arculæ et cellæ eædem. Fit itaque ac si diversi liquores, atque per diversa infundibula, in unum atque idem vas recipiantur. Quare et Theologia aut ex Historia Sacra constat; aut ex Parabolis, quæ instar divinæ Poeseos sunt; aut ex Præceptis et Dogmatibus, tanquam perenni quadam Philosophia. Quod enim ad eam partem pertinet quæ redundare videtur, Prophetiam videlicet; ea Historiæ genus est: quandoquidem Historia Divina ea polleat supra Humanam prærogativa, ut narratio factum præcedere non minus quam sequi possit.

CAPUT II.

Partitio Historiæ in Naturalem *et* Civilem, Ecclesiastica *et* Literaria *sub Civili comprehensa. Partitio Historiæ Naturalis in Historiam* Generationum, Præter-Generationum, *et* Artium.

Historia aut Naturalis est, aut Civilis.[1] In Naturali, naturæ res gestæ et facinora memorantur; in Civili, hominum. Elucent proculdubio Divina in utrisque, sed magis in Civilibus; ut etiam propriam historiæ speciem constituant, quam Sacram aut Ecclesiasticam appellare consuevimus. Nobis vero etiam ea videtur Literarum et Artium dignitas, ut iis historia propria seorsim attribui debeat; quam sub Historia Civili (quemadmodum et Ecclesiasticam) comprehendi intelligimus.

[1] In the *Advancement of Learning*, Bacon had given a quadripartite division of history, — natural, civil, ecclesiastical, and literary. The third and fourth he now includes in the second.

Partitionem *Historiæ Naturalis* moliemur ex statu et conditione ipsius Naturæ, quæ in triplici statu posita invenitur, et tanquam regimen trinum subit. Aut enim libera est natura et cursu consueto se explicans, ut in cœlis, animalibus, plantis, et universo naturæ apparatu; aut a pravitatibus et insolentiis materiæ contumacis et ab impedimentorum violentia de statu suo detruditur, ut in monstris; aut denique ab arte et opera humana constringitur et fingitur, et tanquam novatur, ut in artificialibus. Sit itaque partitio Historiæ Naturalis in Historiam *Generationum, Præter-Generationum,* et *Artium;* quam postremam etiam *Mechanicam* et *Experimentalem* appellare consuevimus. Harum prima *Libertatem Naturæ* tractat; secunda *Errores;* tertia *Vincula.* Libenter autem *Historiam Artium,* ut Historiæ Naturalis speciem constituimus; quia inveteravit prorsus opinio, ac si aliud quippiam esset ars a natura, artificialia a naturalibus; unde illud malum, quod plerique Historiæ Naturalis scriptores perfunctos se putent, si historiam animalium aut plantarum aut mineralium confecerint, omissis artium mechanicarum experimentis.[1] Sed et illabitur etiam animis hominum aliud subtilius malum; nempe, ut ars censeatur solummodo tanquam additamentum quoddam naturæ, cujus scilicet ea sit vis ut naturam (sane) vel inchoatam perficere, vel in deterius vergentem emendare, vel impeditam liberare; minime vero penitus vertere, transmutare, aut in imis concutere possit. Quod ipsum rebus humanis præproperam desperationem intulit. At contra, illud animis hominum penitus insidere debuerat; artificialia a naturalibus non Forma aut Essentia, sed Efficiente solummodo, differre: homini quippe in naturam nullius rei potestatem esse præterquam motus, ut scilicet corpora naturalia aut admoveat aut amoveat; ubi igitur datur admotio corporum naturalium aut remotio, conjungendo (ut vocant) activa passivis, omnia potest homo; ubi non datur, nihil. Neque interest, si res ponantur in ordine ad aliquem effectum, utrum hoc fiat per hominem vel absque homine. Aurum aliquando excoquitur igne, aliquando in arenulis purum

[1] The antithesis of nature and art is a celebrated doctrine in the peripatetic philosophy. Natural things are distinguished from artificial, inasmuch as they have, what the latter are without, an intrinsic principle of formation. Thus Aristotle says: *ἡ γὰρ τέχνη ἀρχὴ καὶ τὸ εἶδος τοῦ γενόμενου, ἀλλ' ἐν ἑτέρῳ, ἡ δὲ τῆς φύσεως κίνησις ἐν αὐτῷ, ἀφ' ἑτέρας οὖσα φύσεως τῆς ἐχούσης τὸ εἶδος ἐνεργείᾳ.* — *De Gen. Anim.* ii. c. 1.

The views which Bacon here expresses as to nature and art recur repeatedly in his writings.

invenitur, ministrante sibi ipsi Natura. Iris similiter fit ex nube roscida in sublimi; fit etiam per aspersionem aquæ, hic apud nos. Itaque Natura omnia regit; subordinantur autem illa tria, *cursus Naturæ; exspatiatio Naturæ;* et *ars*, sive additus rebus *homo;* ideoque in Historia Naturali tria illa comprehendi par est, quod etiam C. Plinius magna ex parte fecit; qui Historiam Naturalem solus pro dignitate complexus est[1], sed complexam minime ut decuit, imo potius indignis modis, tractavit.

Harum prima habetur mediocriter exculta; sequentes duæ ita tenuiter et inutiliter tractantur, ut in *Desideratorum* classe reponendæ sint. Neque enim reperias satis instructam et locupletem collectionem operum naturæ eorum, quæ a cursu ordinario generationum, productionum, et motuum aberrarunt et deflexerunt; sive sint illa fœtus certarum regionum aut locorum singulares; sive temporum eventus insoliti; sive *casuum* (ut ait ille) *ingenia*; sive proprietatum abditarum effectus; sive monodica[2] naturæ in sua specie. Non negaverim inveniri libros nimio plures, fabulosis experimentis, commentitiis secretis, et frivolis imposturis, ad voluptatem et novitatem refertos; cæterum narrationem gravem et severam de heteroclitis et mirabilibus naturæ, diligenter examinatam ac fideliter descriptam, non, inquam, invenio; præsertim cum debita rejectione et publica tanquam proscriptione mendaciorum et fabularum quæ invaluerunt. Nam ut res se nunc habet, si forte mendacia aliqua circa res naturales obtinuerint et celebrata sint (sive quod tantum possit reverentia antiquitatis, sive quod illa denuo examini subjicere sit molestum, sive quod mirifica scilicet ornamenta putantur orationis, propter similitudines et comparationes[3]) nunquam postea exterminantur aut retractantur.

[1] Of Pliny's *Natural History* Humboldt has remarked that it is a book "dem an Reichthum des Inhalts kein anderes Werk des Alterthum's gleich kommt."—*Kosmos*, ii. 23. Sir T. Brown observes that there is scarcely any vulgar error which is not to be found in it.

[2] *Monadica.* See *Nov. Org.* i. 45.

[3] In Gilbert's work *De Magnete* we find an amusing complaint of the same kind. "Celebris semper fama magnetis et succini, doctorum commemorationibus; Magnetem atque etiam succinum invocant philosophi nonnulli, cum in arcanis plurimis illustrandis caligant sensus nec progredi ratio potest. Theologi etiam curiosi mysteria divina ultra humanum sensum posita per magnetem et succinum illustrant, at vani metaphysici cum inutilia phantasmata fundunt, docentque, magnetem habent tanquam Delphicum gladium, exemplum semper ad omnia accommodandum."—*De Magnete*, ii. 2.

It is worthy of remark that in the account Gilbert has given of the magnetical

Finis hujusmodi operis, quod exemplo suo decoravit Aristoteles[1], nil minus est quam ut curiosis et inanibus ingeniis gratificetur, sicut faciunt mirabilarii et prodigiastri; verum duas ob causas, utramque seriam et gravem: unam, ut axiomatum corrigatur iniquitas, quæ plerumque in exemplis tritis et vulgatis fundamentum habent; alteram, quod a miraculis naturæ ad miracula artis expeditus sit transitus et pervius. Neque enim huic rei plus inest negotii, præterquam ut naturæ vestigia persequaris sagaciter, cum ipsa sponte aberret; ut hoc pacto postea, cum tibi libuerit, eam eodem loci deducere et compellere possis. Neque vero præceperim ut ex historia ista mirabilium superstitiosæ narrationes de maleficiis, fascinationibus, incantationibus, somniis, divinationibus, et similibus, prorsus excludantur, ubi de facto et re gesta liquido constet. Nondum enim innotuit quibus in rebus, et quousque, effectus superstitioni attributi ex causis naturalibus participent. Ideoque licet hujusmodi artium usum et praxim merito damnandum[2] censeamus, tamen a speculatione et consideratione ipsarum (si strenue excutiantur) notitiam haud inutilem consequemur, non solum ad delicta in hoc genere reorum rite dijudicanda, sed etiam ad naturæ secreta ulterius rimanda. Neque certe hæsitandum de ingressu et penetratione intra hujusmodi antra et recessus, si quis sibi unicam veritatis inquisitionem proponat; quod et Majestas tua exemplo proprio confirmavit. Tu enim duobus illis clarissimis et acutissimis religionis ac naturalis philosophiæ oculis, tales umbras prudenter ac perspicaciter perlustrasti; ut te Soli simillimum probaveris, qui polluta loca ingreditur, nec tamen inquinatur.[3] Cæterum illud monuerim, narrationes istas cum rebus superstitiosis conjunctas seorsum componi, neque cum puris et sinceris naturalibus commisceri oportere. Quod vero ad narrationes attinet circa prodigia et miracula religionum, illa certe aut non utique vera sunt, aut nulla ex parte naturalia; ideoque ad Historiam Naturalem non pertinent.

Quantum ad Naturæ Historiam Subactæ et Factitiæ, quam Mechanicam appellare solemus; invenio sane collectiones quas-

speculations of earlier writers, almost the only person of whose opinion he speaks with respect is S. Thomas Aquinas, among whose opuscula will be found one on the magnet.

[1] It is generally admitted that the *De Miris Auscultationibus* is not Aristotle's.

[2] So in the original.—*J. S.*

[3] The allusion is to King James's *Dæmonologie*, a work in three books, consisting of dialogues between Philomathes and Epistemon;—the latter of whom represents the king's opinions on witchcraft.

dam de agricultura, etiam de artibus compluribus mechanicis; sed quod pessimum est in hoc genere, semper negliguntur et rejiciuntur experimenta in artibus singulis familiaria et vulgata; quæ tamen ad interpretationem naturæ æque aut plus faciunt quam minus trita. Nam labes quædam literis aspergi videatur, si forte viri docti se submittant inquisitioni aut observationi rerum mechanicarum; nisi fuerit earum, quæ pro arcanis artis aut pro rebus admodum raris aut subtilibus reputentur. Quod tam inanis ac superciliosæ arrogantiæ vitium merito irrisit Plato, quando Hippiam sophistam jactabundum inducit cum Socrate disputantem, sincero et solido veritatis investigatore; qui, cum de pulchritudine sermo institutus esset, pro vago suo et soluto disputandi more, primum intulit exemplum virginis pulchræ, dein equæ pulchræ, postremo ollæ fictilis pulchræ et affabre factæ. Hoc ultimo exemplo Hippias commotus dixit, *Stomacharer certe (nisi humanitatis ratio me eo adigeret) cum quoquam disputare, qui exempla tam vilia et sordida allegaret.* Cui Socrates, *Te quidem ita decet, cum tam nitidis sis amictus vestibus et pulchris calceis;* et alia, per ironiam.[1] Enimvero illud pro certo asseri possit, grandia exempla haud optimam aut tutissimam afferre informationem. Id quod exprimitur non insulse in pervulgata illa fabula de philosopho[2], qui cum stellas sublatis oculis intueretur, incidit in aquam; nam si oculos demisisset, stellas illico in aqua videre potuisset; verum suspiciens in cœlum, aquam in stellis videre non potuit. Eodem modo sæpe accidit ut res minutæ et humiles plus conferant ad notitiam grandium, quam grandes ad notitiam minutarum. Bene siquidem notavit Aristoteles, *Cujusque rei naturam in portionibus ejus minimis optime cerni.* Quam ob causam reipublicæ naturam perscrutatur primo in familia, et in simplicissimis combinationibus societatis, (mariti scilicet et uxoris, parentum et liberorum, domini et servi,) quæ in quolibet tuguriolio occurrunt.[3] Simili plane ratione natura hujusce magnæ civitatis (universitatis nimirum rerum) ejusque dispensatio, in prima quaque symbolizatione et minimis rerum portionibus investiganda est; uti fieri videmus, quod secretum illud naturæ (habitum pro maximo) de verticitate ferri, tactu magnetis exciti,

[1] See the *Hippias major.* The remark however which Hippias makes does not refer to what Socrates has said in his own character, but to what he supposes an imaginary interlocutor to say.

[2] Thales.

[3] Politica. i. 1. sub finem.

ad polos, se conspiciendum præbuit non in vectibus ferreis, sed in acubus.

Ego vero, si quod sit mei pondus judicii, sic plane statuo; Historiæ Mechanicæ usum erga philosophiam naturalem esse maxime radicalem et fundamentalem.[1] Talem intelligo philosophiam naturalem, quæ non abeat in fumos speculationum subtilium aut sublimium, sed quæ efficaciter operetur ad sublevanda vitæ humanæ incommoda. Neque enim ad præsens tantum juvabit, nectendo et transferendo observationes unius artis in usum aliarum, et inde novas commoditates eliciendo, quod necesse est fieri cum experimenta diversarum artium in unius hominis observationem et considerationem venient; sed porro ad causas rerum indagandas et artium axiomata deducenda lucidiorem facem accendet, quam hactenus unquam affulsit. Quemadmodum enim ingenium alicujus haud bene noris aut probaris, nisi eum irritaveris; neque Proteus se in varias rerum facies vertere solitus est, nisi manicis arcte comprehensus; similiter etiam natura arte irritata et vexata se clarius prodit, quam cum sibi libera permittitur.

Antequam vero hoc membrum Historiæ Naturalis (quod Mechanicum atque Experimentale vocamus) dimittamus, illud adjiciendum; corpus talis historiæ non solum ex artibus ipsis mechanicis, verum et ex operativa parte scientiarum liberalium, ac simul ex practicis compluribus (quæ in artem non coaluerunt), confici debere; ut nihil utile prætermittatur quod ad informandum intellectum juvat. Atque hæc est Historiæ Naturalis partitio prima.

CAPUT III.

Partitio Historiæ Naturalis secunda, ex Usu et Fine suo, in Narrativam *et* Inductivam; *quodque Finis nobilissimus Historiæ Naturalis sit, ut ministret et in ordine sit ad condendam philosophiam; quem Finem intuetur* Inductiva. *Partitio Historiæ*

[1] Accordingly this was one of the first things which the Philosophical College which afterwards became the Royal Society attempted to accomplish. Oldenburg writes to Spinoza in September 1661: "In collegio nostro philosophico experimentis et observationibus faciendis gnaviter, quantum per facultates licet, moramur, ratum habentes ex principiis mechanicis formas et qualitates rerum optime posse explicari, et per motum, figuram, atque texturam et varias eorum complicationes omnia naturæ effecta produci, nec opus esse ut ad formas inexplicabiles et qualitates occultas, ceu ignorantiæ asylum, recurramus."

Generationum in Historiam Cœlestium; *Historiam* Meteororum; *Historiam* Globi Terræ et Maris; *Historiam* Massarum *sive* Collegiorum Majorum; *et Historiam* Specierum *sive* Collegiorum Minorum.[1]

Historia Naturalis, ut *subjecto* triplex (quemadmodum diximus) ita *usu* duplex est. Adhibetur enim aut propter Cognitionem Rerum ipsarum quæ historiæ mandantur; aut tanquam Materia Prima philosophiæ. Atque prior illa, quæ aut Narrationum jucunditate delectat, aut Experimentorum usu juvat, atque hujusmodi voluptatis aut fructus gratia quæsita est, longe inferioris notæ censenda, præ ea quæ Inductionis veræ et legitimæ silva sit atque supellex, et primam philosophiæ mammam præbeat. Rursus itaque partiemur Historiam Naturalem in *Narrativam* et *Inductivam*. Hanc autem posteriorem inter Desiderata ponimus. Neque vero aciem mentis alicujus perstringant aut magna antiquorum nomina, aut magna recentium volumina. Satis enim scimus haberi Historiam Naturalem mole amplam, varietate gratam, diligentia sæpius curiosam. Attamen si quis ex ea fabulas et antiquitatem et authorum citationes et inanes controversias, philologiam denique et ornamenta, eximat (quæ ad convivales sermones, hominumque doctorum Noctes, potius quam ad instituendam philosophiam sint accommodata), ad nil magni res recidet. Longe autem profecto abest ab ea historia quam animo metimur. Primo enim desiderantur duæ illæ Historiæ Naturalis partes (de quibus modo diximus), Præter-Generationum et Artium, in quibus nos plurimum ponimus; deinde, in tertia illa (quæ reliqua est) parte generali, nimirum de Generationibus, uni tantum ex quinque partibus ejus satisfacit. Siquidem historiæ Generationum constituuntur partes subordinatæ quinque. Prima *Cœlestium*, quæ phænomena ipsa sincera complectitur, atque separata a dogmatibus. Secunda, *Meteororum* (annumerando etiam cometas) et *Regionum*, quas vocant, *Aëris;* neque enim de cometis, meteoris ignitis, ventis, pluviis, tempestatibus, et reliquis invenitur aliqua historia, quæ ullius sit pretii. Tertia, *Terræ et Maris* (quatenus sunt Universi partes integrales), montium, fluminum, æstuum, arenarum, silvarum, insularum, denique figuræ ipsius continentium prout exporriguntur; in his omnibus potius naturalia inquirendo et observando, quam

[1] This chapter is an addition to the *Advancement of Learning.*

quam cosmographica. Quarta, de *Massis Materiæ communibus*, quas *Collegia Majora* vocamus (vulgo *Elementa* dicuntur); neque enim de igne, aëre, aqua, terra, eorumque naturis, motibus, operibus, impressionibus, narrationes reperiuntur quæ corpus aliquod historiæ justum constituant. Quinta et ultima, de *Collectionibus Materiæ exquisitis*, quæ a nobis *Collegia Minora*, vulgo *Species*, appellantur.[1] In hac autem postrema sola industria scriptorum enituit; ita tamen, ut potius luxuriata sit in superfluis (iconibus animalium aut plantarum, et similibus intumescens), quam solidis et diligentibus observationibus ditata, quæ ubique in Historia Naturali subnecti debeant. Atque, ut verbo dicam, omnis quam habemus Naturalis Historia, tam inquisitione sua quam congerie, nullo modo in ordine ad eum quem diximus finem (condendæ scilicet Philosophiæ) aptata est. Quare Historiam Inductivam desiderari pronunciamus. Atque de *Naturali Historia* hactenus.

CAPUT IV.

Partitio Historiæ Civilis in Ecclesiasticam, Literariam, *et* (*quæ generis nomen retinet*) Civilem: *quodque Historia* Literaria *desideretur. Ejus conficiendæ præcepta.*

Historiam Civilem in tres species recte dividi putamus: primo, *Sacram*, sive *Ecclesiasticam;* deinde eam quæ generis nomen retinet, *Civilem;* postremo, *Literarum* et *Artium.* Ordiemur autem ab ea specie, quam postremo posuimus; quia reliquæ duæ habentur, illam autem inter Desiderata referre visum est. Ea est *Historia Literarum.* Atque certe historia mundi, si hac parte fuerit destituta, non absimilis censeri possit

[1] It is to be observed that the "collegia majora," e. g. earth, are distinguished from "species," such as a rose or a horse, although logically speaking each element may be defined by genus and differentia, as really as any "species infima." In the present day we speak habitually of "different species of earth," of "different kinds of air," and so on, and it is therefore not easy for us to apprehend the notions implied in the text, and in other passages of Bacon's writings, namely that the great elementary masses, air, water, &c., have no true specific character, and that they may in consequence be placed in antithesis to the smaller and more subtly arranged portions of matter, crystals, flowers, animals, &c., which possess a specific form and character. In the first chapter of the third book we find the question suggested, why in rerum naturâ there is not "tanta copia specificati quanta non specificati," that is, why bodies possessing a specific form are not found in so great abundance as those which have merely a general elementary form. To the specific form were ascribed those properties of any body which did not result, or could not be supposed to result, from the combination of the primary qualities of the elements of which that body was composed; and these were commonly termed occult qualities. In these notions we see the origin of such phrases as "specific virtues," "specific action," and so on.

statuæ Polyphemi, eruto oculo; cum ea pars imaginis desit, quæ ingenium et indolem personæ maxime referat. Hanc licet desiderari statuamus, nos nihilominus minime fugit in scientiis particularibus jureconsultorum, mathematicorum, rhetorum, philosophorum, haberi levem aliquam mentionem aut narrationes quasdam jejunas de sectis, scholis, libris, authoribus [1], et successionibus hujusmodi scientiarum; inveniri etiam de rerum et artium inventoribus tractatus aliquos exiles et infructuosos; attamen justam atque universalem Literarum Historiam nullam adhuc editam asserimus. Ejus itaque et argumentum, et conficiendi modum, et usum proponemus.

Argumentum non aliud est, quam ut ex omni memoria repetatur, quæ doctrinæ et artes quibus mundi ætatibus et regionibus floruerint. Earum antiquitates, progressus, etiam peragrationes per diversas orbis partes (migrant enim scientiæ, non secus ac populi), rursus declinationes, obliviones, instaurationes commemorentur. Observetur simul per singulas artes inventionis occasio et origo; tradendi mos et disciplina; colendi et exercendi ratio et instituta. Adjiciantur etiam sectæ, et controversiæ maxime celebres quæ homines doctos tenuerunt; calumniæ quibus patuerunt; laudes et honores quibus decoratæ sunt. Notentur authores præcipui, libri præstantiores, scholæ, successiones, academiæ, societates, collegia, ordines, denique omnia quæ ad statum literarum spectant. Ante omnia etiam id agi volumus (quod Civilis Historiæ decus est, et quasi anima), ut cum eventis causæ copulentur; videlicet ut memorentur naturæ regionum ac populorum; indolesque apta et habilis, aut inepta et inhabilis ad disciplinas diversas; accidentia temporum, quæ scientiis adversa fuerint aut propitia; zeli et mixturæ religionum; malitiæ et favores legum; virtutes denique insignes, et efficacia quorundam virorum erga literas promovendas, et similia. At hæc omnia ita tractari præcipimus, ut non criticorum more in laude et censura tempus teratur; sed plane historice res ipsæ narrentur, judicium parcius interponatur.

De *modo* autem hujusmodi historiæ conficiendæ, illud inprimis monemus; ut materia et copia ejus non tantum ab historiis et criticis petatur, verum etiam ut per singulas annorum centurias, aut etiam minora intervalla, seriatim (ab ultima antiquitate facto principio) libri præcipui qui per ea temporis

[1] *Auctoribus* in the original; and frequently where the word occurs afterwards. But I have adhered to the form used in the *Novum Organum*.—*J. S.*

spatia conscripti sunt in consilium adhibeantur; ut ex eorum non perlectione (id enim infinitum quiddam esset) sed degustatione, et observatione argumenti, stili, methodi, Genius illius temporis Literarius veluti incantatione quadam a mortuis evocetur.

Quod ad *usum* attinet, hæc eo spectant; non ut honor literarum et pompa per tot circumfusas imagines celebretur; nec quia, pro flagrantissimo quo literas prosequimur amore, omnia quæ ad earum statum quoquo modo pertinent usque ad curiositatem inquirere et scire et conservare avemus; sed præcipue ob causam magis seriam et gravem. Ea est (ut verbo dicamus) quoniam per talem qualem descripsimus narrationem, ad virorum doctorum in doctrinæ usu et administratione prudentiam et solertiam maximam accessionem fieri posse existimamus; et rerum intellectualium non minus quam civilium motus et perturbationes, vitiaque et virtutes, notari posse; et regimen inde optimum educi et institui. Neque enim B. Augustini, aut B. Ambrosii opera ad prudentiam episcopi aut theologi tantum facere posse putamus, quantum si Ecclesiastica Historia diligenter inspiciatur et revolvatur. Quod et viris doctis ex Historia Literarum obventurum non dubitamus. Casum enim omnino recipit, et temeritati exponitur, quod exemplis et memoria rerum non fulcitur. Atque de *Historia Literaria* hæc dicta sint.

CAPUT V.

De Dignitate *et* Difficultate Historiæ Civilis. [1]

Sequitur *Historia Civilis* specialis, cujus dignitas atque authoritas inter scripta humana eminet. Hujus enim fidei, exempla majorum, vicissitudines rerum, fundamenta prudentiæ civilis, hominum denique nomen et fama commissa sunt. Ad dignitatem rei accedit difficultas non minor. Etenim animum in scribendo ad præterita retrahere et veluti antiquum facere, temporum motus, personarum characteres, consiliorum trepidationes, actionum (tanquam aquarum) ductus, prætextuum interiora, imperii arcana, cum diligentia scrutari, cum fide et

[1] There is nothing corresponding to this chapter in the *Advancement of Learning*. —*J. S.*

libertate referre, denique verborum lumine sub oculos ponere, magni utique laboris est et judicii; præsertim cum antiquiora quæque incerta, recentiora periculo obnoxia reperiantur. Quamobrem et plurima Historiam istam Civilem circumstant vitia; dum plerique narrationes quasdam inopes et plebeias, et plane dedecora historiarum, conscribant; alii particulares relationes et commentariolos opera festinata et textu inæquali consarciant; alii capita tantum rerum gestarum percurrant; alii contra, minima quæque et ad summas actionum nihil facientia persequantur; nonnulli, nimia erga ingenia propria indulgentia, plurima audacter confingant; ast alii non tam ingeniorum suorum quam affectuum imaginem rebus imprimant et addant, partium suarum memores, rerum parum fideles testes; quidam politica, in quibus sibi complacent, ubique inculcent, et diverticula ad ostentationem quærendo narrationem rerum nimis leviter interrumpant; alii in orationum et concionum, aut etiam actorum ipsorum, prolixitate parum cum judicio nimii sint; adeo ut satis constet, non inveniri inter scripta hominum rarius quicquam, quam historiam legitimam et omnibus numeris suis absolutam. Verum nos in præsenti partitionem doctrinarum instituimus, ut omissa; non censuram, ut vitiosa, notentur. Nunc partitiones Historiæ Civilis persequemur, easque diversorum generum. Minus enim implicabuntur species si partitiones diversæ proponantur, quam si una partitio curiose per membra deducatur.

CAPUT VI.

Partitio prima Historiæ Civilis in Memorias, Antiquitates, *et* Historiam Justam.

Historia Civilis tripartita est, tribus picturarum aut imaginum generibus non absimilis. Videmus enim ex picturis et imaginibus alias imperfectas, ut quibus ultima manus non accesserit; alias perfectas; alias vero vetustate mutilatas et deformatas. Historiam similiter Civilem (quæ imago rerum et temporum quædam est) in tres species, illis picturarum congruas, partiemur; *Memorias* scilicet; *Historiam Justam;* et *Antiquitates.* Memoriæ sunt *Historia inchoata,* aut prima et rudia historiæ lineamenta; Antiquitates vero *Historia deformata*

sunt, sive reliquiæ historiæ, quæ casu e naufragio temporum ereptæ sunt.

Memoriæ, sive præparationes ad historiam, duplicis generis sunt; quorum alterum *Commentarios*, alterum *Registra* vocare placet. Commentarii nudam actionum et eventuum seriem ac connexionem proponunt, prætermissis causis rerum et prætextibus, initiis quoque earundem et occasionibus, consiliis itidem et orationibus, et reliquo actionum apparatu. Talis enim est propria Commentariorum natura, licet Cæsari, per modestiam quandam cum magnanimitate conjunctam, præstantissimæ inter eas quæ exstant historiæ Commentariorum nomen indere placuerit. At Registra duplicis naturæ sunt. Complectuntur enim aut *titulos rerum et personarum* in serie temporum, quales dicuntur Fasti et Chronologiæ; aut *actorum solennitates*, cujus generis sunt principum edicta, senatuum decreta, judiciorum processus, orationes publice habitæ, epistolæ publice missæ, et similia, absque narrationis contextu sive filo continuo.

Antiquitates, seu historiarum reliquiæ, sunt (uti jam diximus) tanquam tabulæ naufragii; cum deficiente et fere submersa rerum memoria, nihilominus homines industrii et sagaces, pertinaci quadam et scrupulosa diligentia, ex genealogiis, fastis, titulis, monumentis, numismatibus, nominibus propriis et stilis, verborum etymologiis, proverbiis, traditionibus, archivis et instrumentis tam publicis quam privatis, historiarum fragmentis librorum neutiquam historicorum locis dispersis; ex his inquam omnibus, vel aliquibus, nonnulla a temporis diluvio eripiunt et conservant. Res sane operosa, sed mortalibus grata, et cum reverentia quadam conjuncta; ac digna certe quæ, deletis fabulosis nationum originibus, in locum hujusmodi commentitiorum substituatur: sed tamen eo minus habens authoritatis, quia paucorum licentiæ subjicitur quod paucis curæ est.

In his Imperfectæ Historiæ generibus defectum aliquem non puto designandum, cum sint tanquam *imperfecte mista;* ut defectus hujusmodi sit ex ipsa earum natura. Ad *Epitomas* quod attinet (historiarum certe teredines et tineas), eas exulare volumus; quod etiam cum plurimis qui maxime sani fuerunt judicii facimus; utpote quæ complura nobilissimarum historiarum corpora exederint et corroderint, atque in fæces inutiles demum redegerint.[1]

[1] Bacon often condemns, and not altogether unjustly, the use of epitomes. The development of a liking for abridgments is certainly a remarkable feature in the decline of Roman literature.

CAPUT VII.

Partitio Historiæ Justæ in Chronica, Vitas, *et* Relationes; *earumque partium explicatio.*

At *Historia Justa* trium est generum, pro ratione objecti quod sibi proponit repræsentandum. Aut enim *portionem aliquam temporis* repræsentat; aut *personam singularem* memoria dignam; aut *actionem aliquam* sive *rem gestam* ex illustrioribus. Primum *Chronica*, sive *Annales*, appellamus; secundum *Vitas;* tertium *Relationes.* Inter quæ, Chronica celebritate et nomine excellere videntur; Vitæ autem fructu et exemplis; Relationes rursus sinceritate et veritate. Chronica namque amplitudinem actionum publicarum, et personarum facies externas et in publicum versas, proponunt; minora autem quæ tum ad res tum ad personas pertinent, omittunt et silentio involvunt. Cum vero id artificii divini sit proprium ut *maxima e minimis suspendat*, fit sæpenumero ut hujusmodi historia, majora tantum persecuta, negotiorum pompam potius et solennia quam eorum veros fomites et texturas subtiliores ostendat; quinetiam, etsi consilia ipsa addat atque immisceat, tamen granditate gaudens, plus gravitatis atque prudentiæ quam revera habent humanis actionibus aspergat; ut satira aliqua possit esse verior humanæ vitæ tabula, quam nonnulla ex ejusmodi historiis. Contra Vitæ, si diligenter et cum judicio perscribantur (neque enim de elogiis et hujusmodi commemorationibus jejunis loquimur), quandoquidem personam singularem pro subjecto sibi proponant, in qua necesse est actiones non minus leves quam graves, parvas quam grandes, privatas quam publicas, componi et commisceri, sane magis vivas et fidas rerum narrationes, et quas ad exemplum tutius et felicius transferre possis, exhibent. At Relationes actionum speciales (qualia sunt Bellum Peloponnesi, Expeditio Cyri, Conjuratio Catilinæ, et similia) omnino puriore et magis sincero veritatis candore vestiri par est, quam Historias Justas temporum; quia argumentum in iis deligi et sumi potest habile et definitum, atque ejusmodi ut de eo notitia et certitudo bona et plena informatio haberi possit: cum contra Historia Temporis (præsertim quæ ætate scriptoris multo antiquior sit) necessario in memoria rerum sæpius fatiscat, et veluti spatia vacua contineat, quæ ingenio et conjectura occupari et suppleri satis licenter consueverunt. Hoc tamen ipsum, quod

de Relationum sinceritate dicimus, cum exceptione intelligendum est; nam fatendum certe est (cum humana omnia ex parte laborent, et commoda cum incommodis fere perpetuo conjuncta sint) hujusmodi Relationes, præsertim si sub ipsa rerum gestarum tempora edantur, (cum sæpius vel ad gratiam vel ad invidiam scribantur,) omnium narrationum merito maxime suspectas esse. Sed rursus huic incommodo etiam illud connascitur remedium; quod illæ ipsæ Relationes, cum non ex una parte solummodo, sed pro factionibus et partium studiis ex utraque parte, semper fere edantur, viam hoc pacto quandam veritati, tanquam inter extrema, aperiunt et muniunt; atque, postquam contentiones animorum deferbuerint, historico bono et prudenti non pessima historiæ perfectioris materia et sementis sunt.

Quod vero ad ea, quæ in his tribus Historiæ generibus desiderari videantur; dubium certe non est, quin plurimæ historiæ particulares (de talibus loquimur quæ esse possint[1] alicujus dignitatis, aut etiam mediocritatis), cum maximo regnorum et rerumpublicarum quibus debentur honoris et nominis detrimento, hucusque prætermissæ sint; quas notare perlongum esset. Cæterum exterarum nationum historias exterorum curæ relinquens (*ne forte sim in aliena republica curiosus*) non possum non apud Majestatem tuam conqueri de Historiæ Angliæ, quæ nunc habetur, vilitate et indignitate, quatenus ad corpus ejus integrum ; necnon Historiæ Scotiæ iniquitate et obliquitate, quatenus ad authorem ejus recentissimum et uberrimum[2]; reputans mecum honorificum admodum Majestati tuæ futurum, atque opus posteritati gratissimum, si quemadmodum insula hæc Magnæ Britanniæ se nunc in unam monarchiam coalitam ad sequentes ætates transmittit, ita in una historia descripta a præteritis sæculis repeteretur; eodem modo quo historiam decem tribuum regni Israëlis et duarum tribuum regni Judæ, tanquam gemellam, Sacra Pagina deducit. Quod si moles hujusmodi historiæ (magna certe et ardua) quominus exacte et pro dignitate perscribatur, videatur obfutura, ecce tibi

[1] In the original, and also in the work as reprinted by Rawley in 1638, the parenthesis ends at *possint*. But the construction seems to require that it be extended to *mediocritatis*.—*J. S.*

[2] Bacon alludes to Buchanan, of whom James speaks with much bitterness in the *Basilicon Doron*. It has been said that Buchanan's mind was failing when he wrote the concluding books of his history, in which Mary Queen of Scots is so much vilified.

memorabilem multo angustioris temporis periodum, quatenus ad Historiam Angliæ; nimirum ab Unione Rosarum ad Unionem Regnorum; spatium temporis quod meo quidem judicio majorem recipit eventuum (quæ[1] raro se ostendunt) varietatem, quam in pari successionum numero uspiam in regno hæreditario deprehendere licet. Incipit enim ab adeptione coronæ mixta, partim armis, partim jure; ingressum siquidem ferrum aperuit, stabilimentum attulerunt nuptiæ; secuta igitur sunt tempora illis initiis consentanea; simillima fluctibus post magnam tempestatem tumores et agitationes suas sed absque aliqua immani procella, retinentibus; atque gubernatoris prudentia, qui unus inter antecessores reges consilio enituit, superatis. Ordine proximus succedit rex, cujus actiones, licet magis impetu quam consilio administratæ, non leve tamen in rebus Europæ momentum attulerunt, eas subinde librando et inclinando prout ipsæ propendebant.[2] Quo etiam regnante, cœpit fieri ingens illa status ecclesiastici mutatio, qualis raro admodum prodit in theatrum. Secutus est rex minor. Dein tentamentum tyrannidis, licet illud brevissimum fuerit, instar febris ephemeræ. Dein regnum feminæ, extero regi nuptæ. Rursus regnum feminæ solitariæ et cœlibis. Hæc omnia demum excepit eventus iste faustus et gloriosus; nimirum hujusce insulæ Britanniæ, a toto orbe divisæ, in se unio; per quam vetus illud oraculum Æneæ redditum, quod requiem ei præmonstrabat,

(Antiquam exquirite matrem)[3]

supra nobilissimas gentes Angliæ et Scotiæ, in nomine illo *Britanniæ, antiquæ suæ matris*, jam convenientes, adimpletum sit; in pignus et tesseram metæ et exitus errorum et peregrinationis jam reperti. Ita ut quemadmodum corpora ponderosa jactata, antequam ponant et consistant, trepidationes quasdam experiantur; eodem modo probabile videtur Divina Providentia factum esse, ut monarchia ista, priusquam in tua Majestate regiaque tua sobole (in qua spero eam in perpetuum fore stabilitam) consisteret et confirmata esset, has tam varias mutationes et vicissitudines, tanquam præludia stabilitatis suæ, subiret.

[1] So in the original. We ought probably to read *eventorum*. — *J. S.*

[2] "In vero che il serenissimo d'Anglia ha mostrato grandissimo animo e ardire in far la guerra, e molta prudenza e magnanimità in trattar la pace." — *Relazione di Marino Cavalli* (1546), in Alberi's collection [ser. 1. vol. i. p. 284.].

[3] Virg. Æn. iii. 96.

De *Vitis* cogitantem, subit quædam admiratio, tempora ista nostra haud nosse bona sua; cum tam rara sit commemoratio et conscriptio vitarum, eorum qui nostro sæculo claruerunt. Etsi enim reges, et qui absolutum principatum obtineant, pauci esse possint; principes etiam in republica libera (tot rebuspublicis in monarchiam conversis) haud multi; utcunque tamen non defuerunt viri egregii (licet sub regibus) qui meliora merentur quam incertam et vagam memoriæ suæ famam, aut elogia arida et jejuna. Etenim hac ex parte inventum cujusdam ex poëtis recentioribus, quo antiquam fabulam locupletavit, non inelegans est. Fingit ille in extremitate fili Parcarum numisma quoddam seu monile pendere, in quo defuncti nomen impressum sit; Tempus autem cultrum Atropi præstolari, et statim abscisso filo numismata eripere, eaque asportata paulo post in fluvium Lethes ex gremio suo projicere; circa fluvium autem magnam avium vim volitare, quæ numismata arripiunt, ac postquam in rostris ipsarum paulisper eadem circumtulerint, paulo post per incuriam in fluvium decidere permittunt; inter eas vero cygnos reperiri nonnullos, qui si numisma aliquod cum nomine prehenderint, illico ad templum quoddam illud deferre solebant, Immortalitati consecratum.[1] Hujusmodi itaque cygni nostris temporibus fere defecerunt. Quamvis autem plurimi hominum, curis et studiis suis nimio plus quam corporibus mortales, nominis sui memoriam veluti fumum aut auram despiciant,

Animi nil magnæ laudis egentes;[2]

quorum scilicet philosophia et severitas ab ea radice pullulat, *Non prius laudes contempsimus, quam laudanda facere desivimus*[3]; id tamen apud nos Salomonis judicio non præjudicabit; *Memoria justi cum laudibus, at impiorum nomen putrescet*[4]: Altera perpetuo floret, alterum aut in oblivionem protinus abit, aut in odorem tetrum computrescit. Ac propterea in eo ipso stilo vel loquendi formula, quæ recte admodum recepta est ut defunctis tribuatur (*fœlicis memoriæ, piæ memoriæ, bonæ memoriæ*) agno-

[1] The poet referred to is Ariosto; *Orlando Furioso* [at the close of the 34th and beginning of the 35th books]. For this reference I am indebted to Mr. Singer, *Notes and Queries*, vol. v. p. 232. He remarks that the *Orlando Furioso* was then popular in the recent translation of Sir John Harrington. It would seem as if Bacon refers to the translation, which ascribes the power of giving immortality to "*Historians* learned and Poets rare," whereas the original speaks only of poets.

[2] Virg. Æn. v. 751.

[3] "Nam postquam desiimus facere laudanda, laudari quoque ineptum putamus." — *Plin. Ep.* iii. 91.

[4] Prov. x. 7.

scere videmur illud quod Cicero (mutuatus id ipsum a Demosthene) protulit, *Bonam famam propriam esse possessionem defunctorum.*[1] Quam quidem possessionem non possum non notare nostro ævo incultam ut plurimum et neglectam jacere.

Quantum ad *Relationes*, optandum esset prorsus ut multo major circa eas adhiberetur diligentia. Quippe vix incidit aliqua actio paulo illustrior, cui non intersit calamus aliquis ex melioribus, qui eam excipere et describere possit. Quoniam autem is perpaucorum hominum esse debet, qui historiam justam pro dignitate conscribat (ut ex paucitate historicorum vel mediocrium satis liquet), idcirco si actiones particulares sub tempus ipsum quo geruntur tolerabili aliquo scripto memoriæ mandarentur, sperandum esset exorituros quandoque, qui historiam justam ope et auxilio illarum *Relationum* conscribere posset. Illæ enim instar seminarii esse possint, unde, cum usus foret, hortus amplus et magnificus consereretur.

CAPUT VIII.[2]

Partitio Historiæ Temporum in Historiam Universalem, *et* Particularem; *et utriusque commoda, et incommoda.*

HISTORIA Temporum aut *Universalis* est, aut *Particularis.* Hæc alicujus *Regni*, vel *Reipublicæ*, vel *Nationis* res gestas complectitur; illa *Universi Orbis.* Neque enim defuerunt, qui Historiam Mundi etiam ab origine scripsisse videri volunt; farraginem rerum et compendia narrationum pro historia exhibentes; alii sui temporis res per orbem terrarum memorabiles

[1] The passage of Cicero to which Bacon alludes is, I apprehend, to be found in the ninth Philippic: "Vita enim mortuorum in memoriâ vivorum est posita." I have not met with the corresponding passage, if there is one, in Demosthenes, and am inclined to believe that Bacon was thinking of the following sentence in Wolf's translation of the *Ad Demonicum* of Isocrates: "Mortem . . . . honeste oppetitam natura peculiare præstantium virorum munus esse voluit." [I should rather suppose that he alluded to the opening of the Λόγος Ἐπιτάφιος (1389. 10): εἰδυῖα γὰρ [ἡ πόλις] παρὰ τοῖς χρηστοῖς ἀνδράσι τὰς μὲν τῶν χρημάτων κτήσεις καὶ τῶν κατὰ τὸν βίον ἡδονῶν ἀπολαύσεις ὑπερεωραμένας, τῆς δ' ἀρετῆς καὶ τῶν ἐπαίνων πᾶσαν τὴν ἐπιθυμίαν οὖσαν, ἐξ ὧν ταῦτ' ἂν αὐτοῖς μάλιστα γένοιτο λόγων, τούτοις ψήθησαν δεῖν αὐτοὺς τιμᾶν, ἵν' ἧν ζῶντες ἐκτήσαντο εὐδοξίαν αὕτη καὶ τετελευτηκόσιν αὐτοῖς ἀποδοθείη. There are other points of resemblance between the ninth Philippic and the Λόγος Ἐπιτάφιος which make it probable that Cicero had it in his eye, and the third form which these two corresponding passages assume in Bacon seems to be the result of an imperfect recollection of both. It represents the exact sentiment of the Greek orator in the shape adopted by the Roman.—*J. S.*]

[2] There is nothing corresponding to this chapter in the *Advancement of Learning.*—*J. S.*

tanquam justa historia complecti posse confisi sunt; conatu profecto magnanimo, atque fructu haud exiguo. Neque enim res humanæ ita imperiis aut regionibus divisæ sunt, ut non habeant multa connexa; quare juvat certe fata, alicui sæculo aut ætati destinata, veluti una tabula contenta et descripta intueri. Fit etiam, ut plurima scripta non contemnenda (qualia sunt eæ de quibus antea locuti sumus Relationes), alias forte peritura neque prelum sæpius passura, aut saltem capita ipsorum, in hujusmodi Historiam Generalem recipiantur, atque hoc pacto figantur et conserventur. Veruntamen, si quis rem rectius perpendat, animadvertet tam severas esse Historiæ Justæ leges, ut eas in tanta argumenti vastitate exercere vix liceat; adeo ut minuatur potius historiæ majestas molis granditate, quam amplificetur. Fiet enim, ut qui tam varia undequaque persequitur, is informationis religione paulatim remissa, et diligentia sua, quæ ad tot res extenditur, in singulis elanguescente, auras populares et rumores captet; et ex relationibus non admodum authenticis, aut hujusmodi aliqua levidensi materia, historiam conficiet. Quinetiam necesse ei erit (ne opus in immensum excrescat) plurima relatu digna consulto prætermittere, atque ad epitomarum rationes sæpius delabi. Incumbit etiam aliud periculum non parvum, atque utilitati illi Historiæ Universalis ex diametro oppositum; quemadmodum enim Universalis Historia narrationes aliquas, quæ alias forte fuissent perituræ, conservat; ita contra sæpenumero narrationes alias satis fructuosas, quæ aliter victuræ fuissent, propter grata mortalibus rerum compendia perimit.

CAPUT IX.

Partitio alia Historiæ Temporum, in Annales *et* Acta Diurna.

Etiam Historia Temporum recte dividitur in *Annales*, et *Diaria;* quæ divisio, licet ex periodis temporum nomina sumat, tamen ad delectum rerum etiam pertinet. Recte enim Cornelius Tacitus, cum in mentionem magnificentiæ quarundam structurarum incidit, statim subdit, *ex dignitate populi Romani repertum esse res illustres Annalibus, talia Diurnis urbis Actis mandare*[1]; applicando Annalibus res quæ ad statum reipublicæ

[1] Tac. Ann. xiii. 31.

pertinent, acta vero et accidentia leviora Diariis. Meo utique judicio, valere conveniret disciplinam quandam Haraldicam in disponendis non minus librorum quam personarum dignitatibus. Sicut enim nihil rebus civilibus magis detrahit, quam ordinum et graduum confusio; ita etiam authoritati historiæ gravis haud parum derogat, si admisceantur politicis res levioris momenti; quales sunt pompæ et solennitates et spectacula, et hujusmodi. Atque sane optandum esset ut illa ipsa distinctio in consuetudinem veniret. Nostris vero temporibus, *Diaria* in navigationibus tantum et expeditionibus bellicis in usu sunt. Apud antiquos certe regum honori dabatur, ut acta palatii sui in Diaria referrentur; quod videmus factum fuisse sub Ahasuero Persarum rege; qui cum noctem ageret insomnem Diaria poposcit, ubi conjurationem Eunuchorum recognovit.[1] At in Alexandri Magni Diariis tam pusilla continebantur, ut etiam si forte ad mensam dormiret in acta reponeretur.[2] Neque enim sicut *Annales* tantum gravia, ita *Diaria* tantum levia complexa sunt; sed omnia promiscue et cursim Diariis excipiebantur, seu majoris seu minoris momenti.

CAPUT X.

Partitio secunda Historiæ Civilis, in Meram *et* Mixtam.

Postrema vero partitio Historiæ Civilis ea sit; ut dividatur in *Meram*, et *Mixtam*. Mixturæ celebres duæ; altera ex Scientia Civili, altera præcipue ex Naturali. Introductum est enim ab aliquibus genus scribendi, ut quis narrationes aliquas, non in serie historiæ continuatas, sed ex delectu authoris excerptas conscribat; deinde easdem recolat et tanquam ruminet; et sumpta ab ipsis occasione, de rebus politicis disserat.[3] Quod genus *Historiæ Ruminatæ* nos sane magnopere probamus, modo hujusmodi scriptor hoc agat, et hoc se agere confiteatur. Historiam autem Justam ex professo scribenti politica ubique ingerere, atque per illa filum historiæ interrumpere, intempestivum quiddam et molestum est. Licet enim Historia quæque

[1] Esther, vi. 1.

[2] Plut. Symp. l. 6.

[3] The most celebrated work of this kind is one with which Bacon was familiar, — the *Discorsi* of Macchiavelli, of which the narrative part is derived from Livy. Ammirati, who died in 1600, took Tacitus as his author. His *Discorsi* never attained the celebrity of those of Macchiavelli.

prudentior politicis præceptis et monitis veluti impregnata sit, tamen scriptor ipse sibi obstetricari non debet.

Mixta etiam est Historia Cosmographica, idque multipliciter. Habet enim ex Historia Naturali, regiones ipsas, atque earum situs et fructus; ex Historia Civili, urbes, imperia, mores; ex Mathematicis, climata et configurationes cœli, quibus tractus mundi subjacent. In quo genere Historiæ sive scientiæ, est quod sæculo nostro gratulemur. Orbis enim terrarum factus est hac nostra ætate mirum in modum fenestratus atque patens. Antiqui certe Zonas et Antipodas noverant,

(Nosque ubi primus equis Oriens afflavit anhelis,
Illic sera rubens accendit lumina Vesper),[1]

idque ipsum magis per demonstrationes quam per peregrinationes. Verum ut carina aliqua parva cœlum ipsum æmularetur; atque universum globum terrestrem, magis etiam obliquo et flexuoso quam cœlestia solent itinere, circumiverit; ea est nostri sæculi prærogativa; ita ut præsens ætas jure in symbolo suo usurpare possit non tantum illud *Plus ultra*[2], ubi antiqui usurpabant *Non ultra;* atque insuper illud *Imitabile fulmen* ubi antiqui *Non imitabile fulmen,*

Demens qui nimbos et non imitabile fulmen;[3]

verum et illud, quod omnem admirationem superat, *Imitabile cœlum;* propter navigationes nostras, quibus circa universum terræ ambitum, cœlestium corporum more, volvi et circumagi sæpius concessum fuit.

Atque hæc præclara in re nautica atque orbe perlustrando fœlicitas, de ulterioribus etiam progressibus et augmentis scientiarum spem magnam facere possit; præsertim cum divino videatur consilio esse decretum, ut hæc duo coæva sint. Sic enim Daniel Propheta, de novissimis temporibus verba faciens, prædicit, *Plurimi pertransibunt et augebitur scientia*[4]; quasi pertransitus sive perlustratio mundi, atque multiplex augmentum scientiarum, eidem sæculo destinarentur; sicut magna ex parte jam completum videmus; quandoquidem tempora nostra, duabus illis prioribus doctrinarum periodis aut revolutionibus (alteri apud Græcos, alteri apud Romanos) eruditione non multum cedant, eas vero in aliquibus longe superent.

[1] Virg. Georg. i. 250.

[2] "Plus ultra," which Bacon often quotes, was the motto adopted by the emperor Charles V.

[3] Virg. Æn. vi. 590.

[4] Daniel, xii. 4.

CAPUT XI.

Partitio Historiæ Ecclesiasticæ, in Ecclesiasticam specialem, Historiam ad Prophetias, *et* Historiam Nemeseos.

Historia Ecclesiastica in genere easdem fere cum Historia Civili partitiones subit. Sunt enim Chronica Ecclesiastica, sunt Vitæ Patrum, sunt Relationes de Synodis et reliquis ad Ecclesiam spectantibus. Proprio vero nomine, recte dividitur in *Historiam Ecclesiasticam* (generis nomine servato) et *Historiam ad Prophetias*, et *Historiam Nemeseos* sive *Providentiæ*. Prima Ecclesiæ Militantis tempora et statum diversum memorat; sive illa fluctuet, ut Arca in Diluvio; sive itineretur, ut Arca in Eremo; sive consistat, ut Arca in Templo; hoc est, Statum Ecclesiæ in Persecutione, in Motu, et in Pace. In hac parte defectum aliquem non invenio; quin supersunt in illa complura potius quam desunt. Illud sane optarem, ut massæ tam prægrandi virtus quoque et sinceritas narrationum responderent.

Secunda pars, quæ est *Historia ad Prophetias*, ex duobus relativis constat, Prophetia ipsa et ejus Adimpletione. Quapropter tale esse debet hujus operis institutum, ut cum singulis ex Scripturis prophetiis, eventuum veritas conjungatur; idque per omnes mundi ætates; tum ad confirmationem fidei, tum ad instituendam disciplinam quandam et peritiam in interpretatione prophetiarum quæ adhuc restant complendæ. Attamen in hac re admittenda est illa latitudo, quæ divinis vaticiniis propria est et familiaris; ut adimpletiones eorum fiant et continenter et punctualiter. Referunt enim Authoris sui naturam, *Cui unus dies tanquam mille anni, et mille anni tanquam unus dies*[1]; atque licet plenitudo et fastigium complementi eorum plerumque alicui certæ ætati vel etiam certo momento destinetur, attamen habent interim gradus nonnullos et scalas complementi per diversas mundi ætates. Hoc opus desiderari statuo; verum tale est ut magna cum sapientia, sobrietate, et reverentia tractandum sit, aut omnino dimittendum.

Tertia pars, quæ *Historia Nemeseos* est, sane in calamos nonnullorum piorum virorum incidit, sed non sine partium studio; occupata est autem in observanda divina illa convenientia, quæ nonnunquam intercedit inter Dei voluntatem revelatam et secretam. Quamvis enim tam obscura sint consilia et judicia

[1] Psalm xc. 4. [and 2 Pet. iii. 8.]

Dei, ut *homini animali* sint penitus inscrutabilia; quinetiam sæpius eorum oculis qui prospiciunt e tabernaculo se subducant; divinæ tamen sapientiæ visum aliquando per vices, ad suorum confirmationem et confusionem eorum qui tanquam sine Deo sunt in mundo, ea, quasi majoribus characteribus descripta, sic proponere conspicienda, ut (sicuti loquitur Propheta) *quivis etiam in cursu ea perlegere possit* [1]; hoc est, ut homines mere sensuales et voluptarii, qui judicia illa divina prætervehi festinant neque cogitationes suas in ea unquam defigunt, tamen quamvis propere currant et aliud agant, ipsa agnoscere cogantur. Talia sunt vindictæ seræ et inopinæ; salutes subito affulgentes et insperatæ; consilia divina per ambages rerum tortuosas et stupendas spiras tandem se manifesto expedientia; et similia; quæ valent non solum ad consolandos animos fidelium, sed ad percellendas et convincendas conscientias improborum.

CAPUT XII.

De Appendicibus Historiæ; quæ circa Verba Hominum (quemadmodum Historia ipsa circa Facta) versantur: Partitio earum in Orationes, Epistolas, *et* Apophthegmata.

At non *Factorum* solummodo humani generis, verum etiam *Dictorum*, memoria servari debet. Neque tamen dubium quin Dicta illa quandoque historiæ ipsi inserantur, quatenus ad res gestas perspicue et graviter narrandas faciant et deserviant. Sed Dicta sive Verba Humana proprie custodiunt libri *Orationum*, *Epistolarum*, et *Apophthegmatum*. Atque *Orationes* sane virorum prudentium, de negotiis et causis gravibus et arduis habitæ, tum ad rerum ipsarum notitiam tum ad eloquentiam

[1] Habbakuk, ii. 2. Bacon seems to have misunderstood the meaning of the passage, the English translation of which is quite in accordance both with the Vulgate and with the Septuagint version. The meaning may be thus paraphrased: "Write so as that the message may be quickly read, in order that the reader may run at once and without loss of time." The idea of quick reading seems to have suggested that of a hasty and careless reader.

In my copy of Acosta's sermons for Advent, which has Bacon's autograph on the fly-leaf, and for which I am indebted to the kindness of the Rev. P. La Trobe, the following words are underlined: "Sed explanari in tabulis visio prophetica jubetur, ut possit celeriter a legente percipi."—*Acostæ Conciones de Adventu*, (Col. Agrip. 1609) p. 178. Bacon perhaps connected *celeriter* with *legente* instead of with *percipi*, and was thus led to suppose that the passage was to be understood in the way in which he has taken it.

multum valent. Sed majora adhuc præstantur auxilia ad instruendam prudentiam civilem ab *Epistolis*, quæ a viris magnis de negotiis seriis missæ sunt. Etenim ex Verbis Hominum nil sanius aut præstantius, quam hujusmodi Epistolæ. Habent enim plus nativi sensus quam orationes, plus etiam maturitatis quam colloquia subita. Eædem quando continuantur secundum seriem temporum (ut fit in illis quæ a legatis, præfectis provinciarum, et aliis imperii ministris, ad reges vel senatus vel alios superiores suos mittuntur, aut vicissim ab imperantibus ad ministros), sunt certe ad Historiam præ omnibus pretiosissima supellex. Neque *Apophthegmata* ipsa ad delectationem et ornatum tantum prosunt, sed ad res gerendas etiam et usus civiles. Sunt enim (ut aiebat ille) veluti *secures* aut *mucrones verborum*, qui rerum et negotiorum nodos acumine quodam secant et penetrant. Occasiones autem redeunt in orbem, et quod olim erat commodum rursus adhiberi et prodesse potest; sive quis ea tanquam sua proferat, sive tanquam vetera. Neque certe de utilitate ejus rei ad civilia dubitari potest, quam Cæsar dictator opera sua honestavit; cujus liber utinam extaret, cum ea quæ usquam habentur in hoc genere nobis parum cum delectu congesta videantur.

Atque hæc dicta sint de *Historia*; ea scilicet parte doctrinæ quæ respondet uni ex Cellis sive Domiciliis Intellectus, quæ est *Memoria*.

CAPUT XIII.

De secundo Membro principali Doctrinæ, nempe Poësi. Partitio Poëseos in Narrativam, Dramaticam, *et* Parabolicam. *Exempla Parabolicæ tria proponuntur.*

Jam ad *Poësim* veniamus. Poësis est genus doctrinæ, verbis plerunque astrictum, rebus solutum et licentiosum; itaque, ut initio diximus, ad Phantasiam refertur, quæ iniqua et illicita prorsus rerum conjugia et divortia comminisci et machinari solet. Poësis autem (ut supra innuimus) duplici accipitur sensu, quatenus ad Verba, vel quatenus ad Res respiciat. Priore sensu, Sermonis quidam Character est: Carmen enim stili genus, et elocutionis formula quædam, nec ad res pertinet; nam et vera narratio carmine, et ficta oratione soluta conscribi potest. Posteriore vero sensu, constituimus eam ab initio

Doctrinæ Membrum Principale, eamque juxta Historiam collocavimus, cum nihil aliud sit quam Historiæ Imitatio ad Placitum. Nos igitur in partitionibus nostris veras doctrinarum venas indagantes et persequentes, neque consuetudini et divisionibus receptis (in multis) cedentes, Satiras et Elegias et Epigrammata et Odas et hujusmodi ab instituto sermone removemus, atque ad philosophiam et artes orationis rejicimus. Sub nomine autem Poëseos de Historia ad Placitum conficta tantummodo tractamus.

Partitio Poëseos verissima atque maxime ex proprietate, præter illas divisiones quæ sunt ei cum Historia communes (sunt enim ficta Chronica, Vitæ fictæ, fictæ etiam Relationes), ea est, ut sit aut *Narrativa*, aut *Dramatica*, aut *Parabolica*. Narrativa prorsus historiam imitatur, ut fere fallat, nisi quod res extollat sæpius supra fidem. Dramatica est veluti historia spectabilis; nam constituit imaginem rerum tanquam præsentium, historia autem tanquam præteritarum. Parabolica vero est historia cum typo, quæ intellectualia deducit ad sensum.

Atque de *Poësi Narrativa*, sive eam *Heroïcam* appellare placet, (modo hoc intelligas de Materia, non de Versu,) ea a fundamento prorsus nobili excitata videtur, quod ad dignitatem humanæ naturæ inprimis spectat. Cum enim mundus sensibilis sit anima rationali dignitate inferior, videtur Poësis hæc humanæ naturæ largiri, quæ historia denegat; atque animo umbris rerum utcunque satisfacere, cum solida haberi non possint.[1] Si quis enim rem acutius introspiciat, firmum ex Poësi sumitur argumentum, magnitudinem rerum magis illustrem, ordinem magis perfectum, et varietatem magis pulchram, animæ humanæ complacere, quam in natura ipsa, post lapsum, reperire ullo modo possit. Quapropter, cum res gestæ et eventus qui veræ historiæ subjiciuntur non sint ejus amplitudinis in qua anima humana sibi satisfaciat, præsto est Poësis, quæ facta magis heroïca confingat; cum historia vera successus rerum minime pro meritis virtutum et scelerum narret, corrigit eam Poësis, et exitus et fortunas secundum merita et ex lege Nemeseos exhibet; cum historia vera, obvia rerum satietate et similitudine, animæ humanæ fastidio sit, reficit eam Poësis, inexpectata et varia et vicissitudinum plena canens. Adeo ut Poësis ista non solum ad delectationem, sed etiam ad animi

[1] "I am sick of all
That dust has shown me; let me dwell in shadows." — Byron.

magnitudinem et ad mores conferat. Quare et merito etiam divinitatis cujuspiam particeps videri possit; quia animum erigit et in sublime rapit, rerum simulacra ad animi desideria accommodando, non animum rebus (quod ratio facit et historia) submittendo. Atque his quidem illecebris et congruitate qua animum humanum demulcet, addito etiam consortio musices unde suavius insinuari possit, aditum sibi patefecit, ut honori fuerit etiam sæculis plane rudibus et apud nationes barbaras, cum aliæ doctrinæ prorsus exclusæ essent.

Dramatica autem *Poësis*, quæ theatrum habet pro mundo, usu eximia est, si sana foret. Non parva enim esse posset theatri et disciplina et corruptela. Atque corruptelarum in hoc genere abunde est; disciplina plane nostris temporibus est neglecta. Attamen licet in rebuspublicis modernis habeatur pro re ludicra actio theatralis, nisi forte nimium trahat e satira et mordeat; tamen apud antiquos curæ fuit, ut animos hominum ad virtutem institueret. Quinetiam viris prudentibus, et magnis philosophis, veluti animorum plectrum quoddam censebatur. Atque sane verissimum est, et tanquam secretum quoddam naturæ, hominum animos cum congregati sint, magis quam cum soli sint, affectibus et impressionibus patere.[1]

[1] There is nothing in the *Advancement of Learning* corresponding to this paragraph.

It is a curious fact that these remarks on the character of the modern drama were probably written, and were certainly first published, in the same year which saw the first collection of Shakespeare's plays; of which, though they had been filling the theatre for the last thirty years, I very much doubt whether Bacon had ever heard. How little notice they attracted in those days as works of literary pretension, may be inferred from the extreme difficulty which modern editors have found in ascertaining the dates, or even the order, of their production. Though numbers of contemporary news-letters, filled with literary and fashionable intelligence, have been preserved, it is only in the Stationer's register and the accounts kept by the Master of the Revels that we find any notices of the publication or acting of Shakespeare's plays. In the long series of letters from John Chamberlain to Dudley Carleton, scattered over the whole period from 1598 to 1623,—letters full of the news of the month; news of the court, the city, the pulpit, and the bookseller's shop; in which court-masques are described in minute detail, author, actors, plot, performance, reception and all;—we look in vain for the name of Shakespeare or of any one of his plays. And yet during that period Hamlet, Twelfth Night, Othello, Measure for Measure, the Merchant of Venice, Macbeth, Lear, the Tempest, the Winter's Tale, Coriolanus, and several more, must have appeared as novelties. And indeed that very letter without which we should hardly know that Shakespeare was personally known to any one in the great world as a distinguished dramatic writer,—I mean Lord Southampton's letter in furtherance of a petition from him and Burbage to the Lord Chancellor Ellesmere—proves at the same time how little was known about him by people of that quality. "This other" (he writes, after describing him as his especial friend and the writer of some of our best English plays,) hath to name William Shakespeare. . . . . Both are right famous in their qualities, though it longeth not of your lordship's gravity and wisdom to resort unto the places where they were wont to delight the public ear." This was

At *Poësis Parabolica* inter reliquas eminet, et tanquam res sacra videtur et augusta; cum præsertim religio ipsa ejus opera plerumque utatur, et per eam commercia divinorum cum humanis exerceat. Attamen et hæc quoque ingeniorum circa allegorias levitate et indulgentia contaminata invenitur. Est autem usus ambigui, atque ad contraria adhibetur. Facit enim ad *involucrum;* facit etiam ad *illustrationem.* In hoc *docendi* quædam *ratio;* in illo *occultandi artificium* quæri videtur. Hæc autem docendi ratio, quæ facit ad *illustrationem,* antiquis sæculis plurimum adhibebatur. Cum enim rationis humanæ inventa et conclusiones (etiam eæ quæ nunc tritæ et vulgatæ sunt) tunc temporis novæ et insuetæ essent, vix illam subtilitatem capiebant ingenia humana, nisi propius eæ ad sensum per hujusmodi simulachra et exempla deducerentur. Quare omnia apud illos fabularum omnigenarum et parabolarum et ænigmatum et similitudinum plena fuerunt. Hinc tesseræ Pythagoræ, ænigmata Sphingis, Æsopi fabulæ, et similia. Quinetiam apophthegmata veterum Sapientum fere per similitudines rem demonstrabant. Hinc Menenius Agrippa apud Romanos (gentem eo sæculo minime literatam) seditionem fabula repressit. Denique ut hieroglyphica literis, ita parabolæ argumentis erant antiquiores. Atque hodie etiam, et semper, eximius est et fuit parabolarum vigor; cum nec argumenta tam perspicua nec vera exempla tam apta esse possint.

Alter est usus Poëseos Parabolicæ, priori quasi contrarius, qui facit (ut diximus) ad *involucrum;* earum nempe rerum, quarum dignitas tanquam velo quodam discreta esse mereatur; hoc est, cum occulta et mysteria Religionis, Politicæ, et Philosophiæ, fabulis et parabolis vestiuntur. Utrum vero fabulis veteribus poëtarum subsit aliquis sensus mysticus, dubitationem nonnullam habet. Atque ipsi certe fatemur nos in eam sententiam propendere, ut non paucis antiquorum poëtarum fabulis mysterium infusum fuisse putemus.[1] Neque nos movet, quod

in 1608; and yet only six years before, when Ellesmere received Elizabeth at Harewood, Othello had been acted there for her entertainment. Even now a writer otherwise unknown hardly becomes known as the author of a successful play. "At present," said Mr. Rogers, "new plays seem hardly to be regarded as literature; people may go to see them acted, but no one thinks of reading them. During the run of *Paul Pry*, I happened to be at a dinner-party, where everybody was talking about it, — that is, about Liston's performance of the hero. I asked first one person, then another, and then another, who was the author of it? Not a man or woman in the company knew that it was written by Poole!" — *Recollections of the Table-talk of Samuel Rogers*, p. 253. — *J. S.*

[1] The hesitating manner in which Bacon here expresses himself shows that he felt,

ista pueris fere et grammaticis relinquantur, et vilescant, ut de illis contemptim sententiam feramus; quin contra cum plane constet scripta illa, quæ fabulas istas recitant, ex scriptis hominum post Literas Sacras esse antiquissima, et longe his antiquiores fabulas ipsas, (etenim tanquam prius creditæ et receptæ, non tanquam excogitatæ ab illis scriptoribus, referuntur); videntur esse instar tenuis cujusdam auræ, quæ ex traditionibus nationum magis antiquarum in Græcorum fistulas inciderunt. Cum vero quæ circa harum parabolarum interpretationem adhuc tentata sint, per homines scilicet imperitos nec ultra locos communes doctos, nobis nullo modo satisfaciant; Philosophiam secundum Parabolas Antiquas inter Desiderata referre visum est. Ejus autem operis exemplum unum aut alterum subjungemus. Non quod res sit fortasse tanti, sed ut institutum nostrum servemus. Id hujusmodi est, ut de operibus illis quæ inter Desiderata ponimus (si quid sit paulo obscurius) perpetuo aut præcepta ad opus illud instruendum, aut exempla proponamus; ne quis forte existimet levem aliquam tantum notionem de illis mentem nostram perstrinxisse, nosque regiones sicut augures animo tantum metiri, neque eas ingrediendi vias nosse. Aliam aliquam partem in Poësi desiderari non invenimus; quin potius cum planta sit Poësis, quæ veluti a terra luxuriante absque certo semine germinaverit, supra cæteras doctrinas excrevit et diffusa est. Verum jam *Exempla* proponemus, tria tantum numero; unum e *Naturalibus*, e *Politicis* unum, atque unum denique e *Moralibus*.

Exemplum primum Philosophiæ secundum Parabolas antiquas, in Naturalibus. *De* Universo, *secundum fabulam* Panis.

Antiqui generationem Panis in dubio relinquunt. Alii enim eum a Mercurio genitum, alii longe alium generationis modum ei tribuunt. Aiunt enim procos universos cum Penelope rem habuisse, ex quo promiscuo concubitu Pana communem filium ortum esse. Neque prætermittenda est tertia illa generationis explicatio. Quidam enim prodiderunt eum Jovis et Hybreos (id est, Contumeliæ) filium fuisse. Utcunque orto, Parcæ illi sorores fuisse perhibentur, quæ in specu subterraneo habita-

what every one in modern times who has considered the subject must I think feel, how difficult it is to enter into the spirit of the ancient mythus. Its essence seems to consist in a half-conscious blending of an idea with something that was accepted as a fact. See particularly on this point Müller's *Introduction to Mythology*. The mythus degenerates into allegory when the idea and the fact are conceived of as antithetical.

bant; Pan autem morabatur sub dio. Effigies Panis talis ab antiquitate describitur; cornutus, cornibus in acutum surgentibus, et usque ad cœlum fastigiatis; corpore toto hispidus et villosus; barba in primis promissa; figura biformis, humana quoad superiora, sed semifera et in capræ pedes desinente. Gestabat autem insignia potestatis, sinistra fistulam ex septem calamis compactam, dextra pedum sive baculum superius curvum et inflexum. Induebatur chlamyde ex pelle pardalis. Potestates ei et munera hujusmodi attribuuntur, ut sit Deus venatorum, etiam pastorum, et in universum ruricolarum; præses item montium. Erat etiam, proximus a Mercurio, nuncius Deorum. Habebatur etiam dux et imperator Nympharum, quæ circa eum perpetuo choreas ducere et tripudiare solebant: comitabantur et Satyri, et his seniores Sileni. Habebat insuper potestatem terrores immittendi, præsertim inanes et superstitiosos, qui et *Panici* vocati sunt. Res gestæ autem ejus non multæ memorantur. Illud præcipuum, quod Cupidinem provocavit ad luctam, a quo etiam in certamine victus est. Etiam Typhonem gigantem retibus implicavit et cohibuit. Atque narrant insuper, cum Ceres mœsta et ob raptam Proserpinam indignata se abscondisset, atque Dii omnes ad eam investigandam magnopere incubuissent et se per varias vias dispertiti essent, Pani solummodo ex fœlicitate quadam contigisse ut inter venandum eam inveniret et indicaret. Ausus est quoque cum Apolline de victoria musices decertare, atque etiam Mida judice prælatus est; ob quod judicium Midas asininas aures tulit, sed clam et secreto. Amores Panis nulli referuntur, aut saltem admodum rari; quod mirum, inter turbam Deorum prorsus tam profuse amatoriam, videri possit. Illud solummodo ei datur, quod Echo adamaret, quæ etiam uxor ejus est habita; atque unam præterea nympham, Syringam nomine; in quam, propter iram et vindictam Cupidinis (quem ad luctam provocare non reveritus esset) incensus est. Etiam Lunam quondam in altas silvas sevocasse dicitur. Neque etiam prolem ullam suscepit (quod similiter mirum est, cum Dii, præsertim masculi, prolifici admodum essent), nisi quod ei attribuatur tanquam filia, muliercula quædam ancilla, Iambe nomine; quæ ridiculis narratiunculis oblectare hospites solebat, ejusque proles ex conjuge Echo esse a nonnullis existimabatur. Parabola talis esse videtur.

Pan (ut et nomen ipsum etiam sonat) Universum, sive Uni-

versitatem Rerum, repræsentat et proponit. De hujus origine duplex omnino sententia est, atque adeo esse potest. Aut enim a *Mercurio* est, verbo scilicet divino (quod et Sacræ Literæ extra controversiam ponunt, et philosophi ipsi qui magis divini habiti sunt viderunt), aut ex *confusis rerum seminibus*. Etenim quidam e philosophis semina rerum etiam substantia infinita statuerunt; unde opinio de homoiomeris fluxit, quam Anaxagoras aut invenit aut celebravit. Nonnulli vero magis acute et sobrie censebant ad varietatem rerum expediendam sufficere, si semina substantia eadem, figuris varia sed certis et definitis, essent; et reliqua in positura et complexu seminum ad invicem ponebant[1]; ex quo fonte opinio de Atomis emanavit, ad quam Democritus se applicavit, cum Leucippus ejus author fuisset. At alii, licet unum rerum principium assererent (aquam Thales, aërem Anaximenes, ignem Heraclitus), tamen illud ipsum principium actu unicum, potentia[2] varium et dispensabile posuerunt, ut in quo rerum omnium semina laterent. Qui vero Materiam omnino spoliatam, et informem, et ad Formas indifferentem introduxerunt, (ut Plato et Aristoteles) multo etiam propius et propensius ad parabolæ figuram accesserunt. Posuerunt enim Materiam tanquam publicam meretricem, Formas vero tanquam procos[3]; adeo ut omnes de rerum principiis opiniones huc redeant et ad illam distributionem reducantur, ut mundus sit vel a Mercurio, vel a Penelope et procis omnibus. Tertia autem Generatio Panis ejusmodi est, ut videantur Græci aliquid de Hebræis mysteriis vel per Ægyptios internuncios, vel utcunque, inaudivisse. Pertinet enim ad statum mundi non in meris natalibus suis, sed post lapsum Adami, morti et corruptioni expositum et obnoxium factum. Ille enim status Dei et Peccati (sive Contumeliæ) proles fuit, ac manet. Fuit enim peccatum Adami ex genere Contumeliæ, cum *Deo similis fieri vellet*. Itaque triplex ista narratio de Generatione Panis etiam vera videri possit, si rite et rebus et temporibus distinguatur. Nam iste Pan (qualem eum nunc intuemur et complectimur) ex *Verbo Divino*, mediante confusa *Materia* (quæ tamen ipsa Dei opus

[1] To this opinion Bacon himself doubtless inclined, but he was not I think a believer in any atomic theory; that is to say, he seems to have rejected the idea of a vacuum. Of Democritus however, so far as relates to his physical theories, he always speaks with respect. Leibnitz has remarked that the view which Bacon here mentions, is common to all the scientific reformers of the early part of the seventeenth century.

[2] The antithesis of the actual and the potential is a fundamental doctrine in the peripatetic philosophy.

[3] See Arist. Physics, i. c. 9.

erat), et subintrante *Prævaricatione* et per eam corruptione, ortum habet.

Naturæ rerum *Fata* rerum sorores vere perhibentur et ponuntur. *Fata* enim vocantur, ortus rerum, et durationes, et interitus; atque depressiones etiam, et eminentiæ, et labores, et fœlicitates, denique conditiones quæcunque individui; quæ tamen nisi in individuo nobili (utpote homine, aut urbe, aut gente) fere non agnoscuntur. Atqui ad istas conditiones tam varias deducit individua illa singula *Pan*, rerum scilicet natura; ut tanquam eadem sit res (quatenus ad individua) catena Naturæ, et filum Parcarum. Ad hæc insuper finxerunt antiqui Panem semper sub dio morari, sed Parcas sub specu ingenti subterraneo habitare, atque inde maxima pernicitate ad homines subito advolare; quia Natura atque Universi facies spectabilis est et aperta, at Fata individuorum occulta et rapida. Quod si Fatum accipiatur largius, ut omnem prorsus eventum, non illustriores tantum denotet, tamen utique et eo sensu optime convenit cum universitate rerum; cum ex ordine naturæ nil tam exiguum sit quod sine causa fiat, et rursus nil tam magnum ut non aliunde pendeat; adeo ut fabrica ipsa naturæ suo sinu et gremio omnem eventum et minimum et maximum complectatur, et suo tempore certa lege prodat. Itaque nil mirum, si Parcæ ut Panis sorores introductæ sint, et certe legitimæ. Nam Fortuna vulgi filia est, et levioribus tantum philosophis placuit. Sane Epicurus non solum profanum instituere sermonem, sed etiam desipere videtur, cum dixit *præstare credere fabulam Deorum quam Fatum asserere*[1]; ac si quicquam in Universo esse possit instar insulæ, quod a rerum nexu separetur. Verum Epicurus, philosophiam suam naturalem (ut ex ipsius verbis patet) morali suæ accommodans et subjiciens, nullam opinionem admittere voluit quæ animum premeret et morderet, atque *Euthymiam* illam (quam a Democrito acceperat) lacesseret aut turbaret. Itaque suavitati cogitationum indulgens potius quam veritatis patiens, plane jugum jactavit, et tam Fati necessitatem quam Deorum metum repudiavit. Verum de Parcarum germanitate cum Pane satis dictum est.

[1] See Diog. Laert. x. 134. The expressions of which Epicurus made use are sufficiently striking, ἐπεὶ κρεῖττον ἦν τῷ περὶ θεῶν μύθῳ κατακολούθειν ἢ τῇ τῶν φυσικῶν εἱμαρμένῃ δουλεύειν; the reference being, as Menage, following Gassendi, remarks, to the doctrines of the earlier physicists, Democritus, &c.

For some remarks on the "fatis avolsa voluntas" of Epicurus, see Stewart's *Dissertation on the Progress of Philosophy*, note MM.

Cornua autem mundo attribuuntur, ab imo latiora, ad verticem acuta. Omnis enim rerum natura instar pyramidis acuta est. Quippe individua, in quibus basis naturæ exporrigitur, infinita sunt; ea colliguntur in species, et ipsas multiplices; species rursus insurgunt in genera, atque hæc quoque ascendendo in magis generalia contrahuntur; ut tandem natura tanquam in unum coïre videatur; quod figura illa *pyramidali* Cornuum Panis significatur. Mirum vero minime est, Panis cornua etiam cœlum ferire; cum excelsa naturæ, sive ideæ universales, ad divina quodam modo pertingant. Itaque et catena illa Homeri decantata, (causarum scilicet naturalium,) ad pedem solii Jovis fixa memorabatur; neque quisquam (ut videre est) metaphysicam et quæ in natura æterna et immobilia sunt tractavit, atque animum a fluxu rerum paulisper abduxit, qui non simul in Theologiam Naturalem inciderit; adeo paratus et propinquus est transitus a vertice illa pyramidis ad divina.

Corpus autem *Naturæ* elegantissime et verissime depingitur *hirsutum*, propter rerum radios. Radii enim sunt tanquam Naturæ crines, sive villi; atque omnia fere vel magis vel minus radiosa sunt. Quod in facultate visus manifestissimum est; nec minus in omni virtute magnetica et operatione ad distans. Quidquid enim operatur ad distans, id etiam radios emittere recte dici potest. Sed maxime omnium prominet *Barba Panis*, quia radii corporum cœlestium, et præcipue Solis, maxime ex longinquo operantur et penetrant; adeo ut superiora terræ, atque etiam interiora ad distantiam nonnullam, plane verterint et subegerint, et spiritu impleverint. Elegantior autem est figura de Barba Panis, quod et Sol ipse, quando parte superiore ejus nube obvoluta radii inferius erumpunt, ad aspectum *barbatus* cernitur.

Etiam corpus Naturæ rectissime describitur *biforme*, ob differentiam corporum superiorum et inferiorum. Illa enim ob pulchritudinem et motus æqualitatem et constantiam, necnon imperium in terram et terrestria, merito sub humana figura repræsentantur; cum natura humana ordinis et dominationis particeps sit. Hæc autem ob perturbationem, et motus incompositos, et quod a cœlestibus in plurimis regantur, bruti animalis figura contenta esse possunt. Porro eadem corporis biformis descriptio pertinet ad participationem specierum. Nulla enim Naturæ species simplex videri potest, sed tanquam ex duobus participans et concreta. Habet enim homo nonnihil ex

bruto, brutum nonnihil ex planta, planta nonnihil ex corpore inanimato, omniaque revera biformia sunt, et ex specie superiore et inferiore compacta. Acutissima autem est allegoria de *Pedibus Capræ*, propter ascensionem corporum terrestrium versus regiones aëris et cœli, ubi etiam pensilia fiunt, et inde dejiciuntur magis quam descendunt. Capra enim animal scansorium est, eaque e rupibus pendere atque in præcipitiis hærere amat; similiter etiam res, licet inferiori globo destinatæ, faciunt; idque miris modis, ut in nubibus et meteoris manifestissimum est. Imo non sine causa Gilbertus, qui de magnete laboriosissime et secundum viam experimentalem conscripsit, dubitationem injecit: numnon forte corpora gravia, post longam a terra distantiam, motum versus inferiora paulatim exuant?[1]

Insignia autem in manibus Panis ponuntur duplicia; alterum *harmoniæ*, alterum *imperii*. *Fistula* enim ex *septem calamis* concentum rerum et harmoniam, sive concordiam cum discordia mixtam (quæ ex septem stellarum errantium motu conficitur), evidenter ostendit. Neque enim alii, præterquam septem planetarum, inveniuntur in cœlo errores sive expatiationes manifestæ, quæ cum æqualitate stellarum fixarum earumque perpetua et invariabili ad se invicem distantia compositæ et temperatæ, tum constantiam specierum tum fluxum individuorum tueri et ciere possint. Si qui vero sint planetæ minores, qui non conspiciuntur; si qua etiam mutatio in cœlo major (ut in cometis nonnullis superlunaribus); videntur illa profecto tanquam fistulæ aut omnino mutæ aut ad tempus tantum streperæ; utpote quarum operationes vel ad nos non perlabantur, vel harmoniam illam septem fistularum Panis non diu interturbent.[2] *Pedum* autem illud *Imperii* nobilis translatio est, propter vias naturæ partim rectas, partim obliquas. Atque

[1] Gilbert was of opinion that the earth is a great magnet which attracts all bodies near its surface, although phenomena of polarity are only developed in a few cases. To every magnet he ascribed an "orb of virtue" beyond which it exerts no influence whatever, and also a smaller "orb of coition" such that the magnet cannot produce motion in any portion of matter which lies beyond it. As a heavy body therefore approaches the limit of the earth's orb of coition its downward tendency gradually diminishes. Imperfect as these views are they show how clearly Gilbert had apprehended the general idea of attraction, and how little reason Voltaire had for his assertion that Bacon "a deviné l'attraction." [See note on *Nov. Org.* p. 299.]

[2] For dreams about the music of the spheres, see Robert Fludd's work *Utriusque Cosmi, majoris scilicet et minoris, metaphysica, physica, et technica Historia*, 1617. The third book of the first tractate is wholly *De Musicâ mundanâ*, and is illustrated by an engraving of a bass viol, of which the dimensions extend through the solar system. Bacon was, not improbably, acquainted with Fludd, who was one of the most learned of the cabalistic philosophers.

Baculum illud, sive *Virga*, versus superiorem partem præcipue curva est, quia omnia Providentiæ Divinæ opera in mundo fere per ambages et circuitus fiunt; ut aliud agi videri possit, aliud revera agatur: sicut Josephi venditio in Egyptum, et similia. Quinetiam in regimine humano omni prudentiore, qui ad gubernacula sedent, populo convenientia, per prætextus et vias obliquas fœlicius quæ volunt quam ex directo, superinducunt et insinuant. Etiam (quod mirum fortasse videri possit) in rebus mere naturalibus, citius naturam fallas quam premas; adeo quæ ex directo fiunt inepta sunt et seipsa impediunt; cum contra via obliqua et insinuans molliter fluat, et effectum sortiatur. *Vestis Panis* et amiculum ingeniose admodum ex *pelle pardalis* fuisse fingitur, propter maculas ubique sparsas. Cœlum enim stellis, maria insulis, tellus floribus, consperguntur; atque etiam res particulares fere variegatæ esse solent circa superficiem, quæ veluti *rei chlamys* est.

Officium autem Panis nulla alia re tam ad vivum proponi atque explicari potuerit, quam quod *Deus Venatorum* sit. Omnis enim naturalis actio, atque adeo motus et progressio, nihil aliud quam *Venatio* est. Nam et scientiæ et artes opera sua venantur; et consilia humana fines suos; atque res naturales omnes vel alimenta sua ut conserventur, vel voluptates et delicias suas ut perficiantur, venantur; (omnis siquidem venatio est aut prædæ aut animi causa;) idque modis peritis et sagacibus;

> Torva leæna lupum sequitur, lupus ipse capellam,
> Florentem cytisum sequitur lasciva capella.[1]

Etiam *Ruricolarum* in genere Pan *Deus* est, quia hujusmodi homines magis secundum naturam vivant, cum in urbibus et aulis natura a cultu nimio corrumpatur; ut illud poëtæ amatorium, verum propter hujusmodi delicias etiam de natura sit,

> —— Pars minima est ipsa puella sui.[2]

Montium autem inprimis *Præses* dicitur Pan, quia in montibus et locis editis Natura Rerum panditur, atque oculis et contemplationi magis subjicitur. Quod alter a Mercurio *Deorum Nuncius* sit Pan, ea allegoria plane divina est; cum, proxime post verbum Dei, ipsa mundi imago divinæ potentiæ et sapientiæ præconium sit. Quod et poëta divinus cecinit, *Cœli enarrant gloriam Dei, atque opera manuum ejus indicat firmamentum.*[3]

[1] Virg. Ecl. ii. 63. [2] Ovid. Remed. Amor. 344. [3] Psalm xix. 1.

At Pana oblectant *Nymphæ*, Animæ scilicet; deliciæ enim mundi Animæ viventium sunt. Hic autem merito illarum imperator, cum illæ naturam quæque suam tanquam ducem sequantur, et circa eum infinita cum varietate, veluti singulæ more patrio, saltent et choreas ducant, motu neutiquam cessante. Itaque acute quidam ex recentioribus facultates animæ omnes ad Motum reduxit, et nonnullorum ex antiquis fastidium et præcipitationem notavit, qui memoriam et phantasiam et rationem defixis præpropere oculis intuentes et contemplantes, Vim Cogitativam, quæ primas tenet, prætermiserunt.[1] Nam et qui meminit, aut etiam reminiscitur, cogitat; et qui imaginatur similiter cogitat; et qui ratiocinatur utique cogitat: denique Anima, sive a sensu monita, sive sibi permissa, sive in functionibus intellectus, sive affectuum et voluntatis, ad modulationem cogitationum saltat; quæ est illa Nympharum tripudiatio. Una vero perpetuo comitantur *Satyri* et *Sileni*, Senectus scilicet et Juventus. Omnium enim rerum est ætas quædam hilaris et motu gaudens, atque rursus ætas tarda et bibula; utriusque autem ætatis studia vere contemplanti fortasse ridicula et deformia videantur, instar *Satyri* alicujus aut *Sileni*. De *Panicis* autem *Terroribus* prudentissima doctrina proponitur. Natura enim rerum omnibus viventibus indidit metum et formidinem, vitæ atque essentiæ suæ conservatricem, ac mala ingruentia vitantem et depellentem. Veruntamen eadem Natura modum tenere nescia est, sed timoribus salutaribus semper vanos et inanes admiscet; adeo ut omnia, (si intus conspici darentur,) *Panicis terroribus* plenissima sint; præsertim humana; et maxime omnium apud vulgum, qui superstitione (quæ vere nihil aliud quam *Panicus Terror* est) in immensum laborat et agitatur, præcipue temporibus duris et trepidis et adversis. Neque superstitio ista tantummodo in vulgo regnat, sed ab opinionibus vulgi etiam in sapientiores aliquando insilit, ut divine Epicurus (si cætera quæ de Diis disseruit ad hanc normam fuissent) locutus sit; *Non Deos vulgi negare profanum, sed vulgi opiniones Diis applicare profanum.*[2]

Quod vero attinet ad *audaciam* Panis, et *pugnam* per *provocationem* cum *Cupidine;* id eo spectat, quia materia non caret

[1] The writer referred to is A. Donius. See his *De Naturâ Hominis*, 1581, the title of the twenty-first chapter of the second book of which is *Omnes Operationes Spiritus esse Motum et Sensum.* For an account of this "motus" see the sixteenth chapter of the second book. As might be supposed, Donius is altogether a materialist.

[2] Diogenes Laert. x. 123.

inclinatione et appetitu ad dissolutionem mundi et recidivationem in illud Chaos antiquum, nisi prævalida rerum concordia (per Amorem sive Cupidinem significata) malitia et impetus ejus cohiberetur, et in ordinem compelletur.[1] Itaque bono admodum hominum et rerum fato fit (vel potius immensa bonitate divina) ut Pan illud certamen adversum experiatur, et victus abscedat. Eodem prorsus pertinet et illud de *Typhone* in *retibus* implicato, quia utcunque aliquando vasti et insoliti rerum tumores sint (id quod *Typhon* sonat), sive intumescant maria, sive intumescant nubes, sive intumescat terra, sive alia, tamen rerum natura hujusmodi corporum exuberantias atque insolentias reti inextricabili implicat et coërcet, et veluti catena adamantina devincit.

Quod autem *Inventio Cereris* huic Deo attribuatur, idque inter venationem; reliquis autem Diis negetur, licet sedulo quærentibus et illud ipsum agentibus; monitum habet rarum admodum et prudens: hoc scilicet, ne rerum utilium ad vitam et cultum inventio a philosophiis abstractis, tanquam Diis Majoribus, expectetur, licet totis viribus in illud ipsum incumbant; sed tantummodo a *Pane*, id est experientia sagaci, et rerum mundi notitia universali; quæ etiam casu quodam, ac veluti inter venandum, in hujusmodi inventa incidere solet. Utilissima enim quæque inventa experientiæ debentur, et veluti donaria quædam fuere casu in homines sparsa.

Illud autem *Musices certamen* ejusque eventus salutarem exhibet doctrinam, atque eam quæ rationi et judicio humano gestienti et se efferenti sobrietatis vincula injicere possit. Duplex enim videtur esse harmonia, et quasi *Musica;* altera sapientiæ divinæ, altera rationis humanæ. Judicio enim humano, ac veluti auribus mortalium, administratio mundi et rerum et judicia divina secretiora sonant aliquid durum et quasi absonum; quæ inscitia licet asininis auribus merito insigniatur, tamen et illæ ipsæ aures secreto non palam gestantur. Neque enim hujusce rei deformitas a vulgo conspicitur aut notatur.

Postremo minime mirum est si nulli *Amores* Pani attribuantur, præter *Conjugium Echus.* Mundus enim se ipso, atque in se rebus omnibus, fruitur; qui amat autem frui vult; neque in copia desiderio locus est. Itaque mundi amores esse nulli possunt, nec potiundi cupido (cum se ipse contentus sit), nisi

[1] So in the original.

fortasse amores *Sermonis.* Ii sunt *Nympha Echo,* res non solida sed vocalis; aut si accuratiores sint, *Syringa,* quando scilicet verba et voces numeris quibusdam, sive poëticis sive oratoriis, et tanquam modulamine reguntur. Inter sermones autem sive voces, excellenter ad conjugium mundi sumitur sola *Echo.* Ea enim demum vera est philosophia, quæ mundi ipsius voces fidelissime reddit, et veluti dictante mundo conscripta est; et nihil aliud est quam ejusdem simulachrum et reflexio; neque addit quicquam de proprio, sed tantum iterat et resonat. Nam quod *Lunam* Pan in altas silvas aliquando sevocasset, videtur pertinere ad congressum sensus cum rebus cœlestibus sive divinis. Nam alia est *Endymionis* ratio, alia *Panis.* Ad Endymionem dormientem sponte se demittit Luna; siquidem ad intellectum sopitum, et a sensibus abductum, quandoque sponte influunt divina; quod si accersantur et vocentur a sensu, tanquam a Pane, tum vero non aliud lumen præbent quam illud,

> Quale sub incertam lunam, sub luce maligna,
> Est iter in silvis.[1]

Ad mundi etiam sufficientiam et perfectionem pertinet, quod *prolem non edat.* Ille enim per partes generat; per totum quomodo generare possit, cum corpus extra ipsum non sit? Nam de *muliercula* illa *Iambe, filia Panis* putativa, est sane ea adjectio quædam ad fabulam sapientissima. Per illam enim repræsentantur eæ, quæ perpetuis temporibus passim vagantur atque omnia implent, vaniloquæ de rerum natura doctrinæ, reipsa infructuosæ, genere quasi subditiciæ, garrulitate vero interdum jucundæ, interdum molestæ et importunæ.

Exemplum alterum Philosophiæ, secundum Parabolas antiquas, in Politicis. *De Bello, secundum fabulam* Persei.

Perseus, Orientalis cum fuisset, missus traditur a Pallade ad obtruncandam Medusam; quæ populis plurimis ad Occidentem in extremis Iberiæ partibus maximæ calamitati fuit. Monstrum enim hoc, alias crudele et immane, etiam aspectu tam dirum atque horrendum fuit, ut eo solo homines in saxa verteret. Erat autem e Gorgonibus una Medusa, ac sola inter eas mortalis, cum reliquæ passivæ non essent. Perseus igitur, ad tam nobile facinus se comparans, arma ad dona a tribus Diis mutuo

[1] Virg. Æn. vi. 270. The first *sub* ought of course to be *per*.

accepit; *alas* a Mercurio, talares scilicet non axillares: a Plutone autem *galeam; scutum* denique a Pallade et *speculum.* Neque tamen (licet tanto apparatu instructus) ad Medusam recta perrexit, sed primum ad Græas divertit. Eæ sorores ex altera parente Gorgonibus erant. Atque Grææ istæ canæ etiam a nativitate erant, et tanquam vetulæ. Oculus autem iis tantummodo et dens erat omnibus unicus; quos, prout exire foras quamque contigerat, vicissim gestabant, reversæ autem deponere solebant. Hunc itaque oculum atque hunc dentem illæ Perseo commodarunt. Tum demum cum se abunde ad destinata perficienda instructum judicaret, ad Medusam properavit impiger et volans. Illam autem offendit dormientem, neque tamen aspectui ejus (si forsan evigilaret) se committere audebat, sed cervice reflexa et in speculum illud Palladis inspiciens, atque hoc modo ictus dirigens, caput Medusæ abscidit. Ex sanguine vero ejusdem in terram fuso statim Pegasus alatus emicuit. Caput autem abscissum Perseus in scutum Palladis transtulit et inseruit, cui etiamnum sua mansit vis, ut ad ejus intuitum omnes ceu attoniti aut syderati obrigerent.

Fabula conficta videtur de *belligerandi* ratione et prudentia. Atque primo omnis *belli susceptio* debet esse tanquam *missio a Pallade;* non a Venere certe (ut bellum Trojanum fuit), aut alia levi ex causa; quippe cum in consiliis solidis decreta de bellis fundari oporteat. Deinde de *genere belli* eligendo tria proponit fabula præcepta, sana admodum et gravia. Primum est, ut de *subjugatione nationum finitimarum* quis non magnopere laboret. Neque enim eadem est patrimonii et imperii amplificandi ratio. Nam in possessionibus privatis vicinitas prædiorum spectatur, sed in propagando imperio occasio et belli conficiendi facilitas et fructus loco vicinitatis esse debent. Itaque Perseus, licet Orientalis, tamen tam longinquam expeditionem usque ad extremum Occidentem minime detrectavit. Hujus rei exemplum insigne est in belligerandi diversa ratione patris et filii regum, Philippi et Alexandri. Ille enim in finitimis bellis occupatus urbes paucas imperio adjecit, idque non sine maxima contentione et periculo; quippe qui et alias, et præcipue in prælio Chæroneo, in ultimum discrimen adductus fuit; at Alexander, longinquam expeditionem bene ausus in Persas, nationes infinitas subjugavit, magis itineribus quam præliis fatigatus. Hoc ipsum adhuc clarius cernitur in propagatione imperii Romanorum, qui quo tempore ex parte Occi-

dentis vix ultra Liguriam armis penetraverant, eodem tempore Orientis provincias usque ad montem Taurum armis et imperio complexi sunt. Etiam Carolus Octavus rex Galliæ bellum Britannicum (quod matrimonio [1] tandem compositum est) non admodum facile expertus, expeditionem illam Neapolitanam longinquam admiranda quadam facilitate et fœlicitate transegit. Habent certe hoc bella longinqua, ut cum iis manus conseratur qui militiæ et armis invasoris minime sint assueti, quod in finitimis secus se habet. Etiam et apparatus in hujusmodi expeditionibus solet esse diligentior et instructior, et terror apud hostes ex ipso ausu et fiducia major. Neque etiam fere possit fieri in illis expeditionibus remotis, per hostes ad quos tam longo itinere pervenitur, diversio aliqua aut invasio reciproca, quæ in belligerandi ratione cum finitimis sæpius adhibetur. Caput autem rei est, quod in subjugandis finitimis occasionum delectus in augusto versatur; at si quis longinquiora non detrectet, poterit pro arbitrio suo eo transferre bellum ubi aut disciplina militaris maxime est enervata, aut vires nationis plurimum attritæ et consumptæ, aut dissidia civilia opportune oborta, aut aliæ hujusmodi commoditates se ostendant. Secundum est, ut semper subsit *causa belli* justa et pia et honorifica et favorabilis. Id enim alacritatem tum militibus tum populis impensas conferentibus addit, et societates aperit et conciliat, et plurimas denique commoditates habet. Inter causas autem belli, admodum favorabilis est ea quæ ducit ad debellandas tyrannides, sub quibus populus succumbit et prosternitur sine animis et vigore, tanquam sub *Aspectum Medusæ;* quod etiam Herculi divinitatem conciliavit. Romanis certe magna religio fuit, strenue et impigre accurrere ad socios tuendos, si quoquo modo oppressi fuissent. Etiam bella ob vindictam justam fere semper fœlicia fuerunt, sicut bellum adversus Brutum et Cassium ad vindicandam mortem Cæsaris; Severi ad vindicandam mortem Pertinacis; Junii Bruti ad vindicandam mortem Lucretiæ. Denique quicunque bello calamitates hominum et injurias aut levant aut vindicant, sub Perseo militant. Tertium, ut in omni bello suscipiendo vera sit *æstimatio virium;* atque recte perpendatur utrum bellum sit tale quod confici et ad exitum perduci possit, ne quis vastas et infinitas spes persequatur. Prudenter enim Perseus inter Gorgonas (per quas bella representantur)

[1] In 1491 Charles the Eighth married Anne of Brittany, and thus put an end to the war which Bacon here speaks of.

eam delegit quæ in sua natura mortalis erat, neque ad impossibilia animum adjecit. Atque de iis quæ in suscipiendo bello deliberationem subeunt, hæc præcipit fabula; reliqua ad belligerationem ipsam pertinent.

In bello maxime omnium prosunt illa tria Dona Deorum, adeo ut fortunam ipsam fere regant et trahant. Accepit enim Perseus *celeritatem* a *Mercurio*, *occultationem consiliorum* ab *Orco*, et *providentiam* a *Pallade*. Neque caret allegoria, eaque prudentissima, quod alæ illæ celeritatis in rebus conficiendis (cum celeritas in bello plurimum possit) *talares* non *axillares* fuerint, atque pedibus non humeris additæ; quia non tam in primis belli aggressibus, quam in iis quæ sequuntur et primis subsidio sunt, celeritas requiritur. Nullus enim error in bello magis frequens fuit, quam quod prosecutiones et subsidiarii impetus initiorum alacritati non respondeant. At *galea Plutonis* (quæ homines invisibiles reddere solebat) manifesta parabola est. Nam *consiliorum occultatio*, post *celeritatem*, maximi ad bellum est momenti. Cujus etiam celeritas ipsa pars magna est. Celeritas enim consiliorum evulgationem prævertit. Ad galeam Plutonis spectant, ut unus bello præsit cum mandatis liberis; consultationes enim cum multis habent aliquid potius ex cristis Martis, quam ex galea Plutonis. Eodem spectant prætextus varii, et designationes ancipites, et famæ emissariæ, quæ oculos hominum aut perstringunt aut avertunt, atque vera consiliorum in obscuro ponunt. Etiam cautiones diligentes et suspicaces de literis, de legatis, de perfugis, et complura alia, galeam Plutonis ornant et revinciunt. At non minus interest *consilia hostium* explorare, quam sua occultare. Itaque galeæ Plutonis adjungendum est *speculum Palladis*, per quod hostium vires, inopia, occulti fautores, dissidia et factiones, progressus, consilia cernantur. Quoniam vero tantum fortuitorum suscipit bellum, ut nec in consiliis propriis occultandis nec in hostium explorandis nec in celeritate ipsa multum fiduciæ ponendum sit, ideo ante omnia sumendum *Palladis scutum*, *Providentiæ* scilicet, ut quam minimum Fortunæ relinquatur. Huc pertinent, explorato vias inire, castra diligenter munire (quod in militia moderna in desuetudinem fere abiit, castra vero instar urbis munitæ Romanis ad adversos prælii eventus erant), acies stabilis et ordinata, non nimium fidendo cohortibus levis armaturæ, aut etiam equitum turmis; denique, omnia quæ ad solidam et sollicitam defensivam spectant; cum plus valeat utique in

bellis scutum Palladis, quam gladius ipse Martis. Verum Perseo utcunque copiis aut animis instructo restat aliud quidpiam, maximi per omnia momenti, antequam bellum incipiatur: nimirum, ut *divertat ad Græas.* Grææ autem *proditiones* sunt, bellorum scilicet sorores, non germanæ illæ quidem, sed generis nobilitate quasi impares. Bella enim generosa, proditiones degeneres et turpes. Earum descriptio elegans est, ut *canæ* a nativitate sint et tanquam *vetulæ,* propter perpetuas proditorum curas et trepidationes. Earum autem vis, (antequam in manifestam defectionem erumpant,) aut in *oculo,* aut in *dente* est. Omnis enim factio, a statu quopiam alienata et in proditionem propensa, et *speculatur* et *mordet.* Atque hujusmodi oculus et dens tanquam *communis* est; nam quicquid didicerunt et noverunt, fere per manus ab una ad alteram transit et percurrit. Et quod ad *dentem* attinet, uno quasi ore mordent, et eadem scandala jactant; ut si unam audias, omnes audias. Itaque Perseo sunt istæ Grææ conciliandæ atque in auxilium adducendæ, præsertim ut oculum et dentem suum ei commodent; oculum ad indicia, dentem ad rumores serendos et invidiam conflandam et animos hominum sollicitandos. Postquam vero omnia bene sint ad bellum præparate disposita, illud in primis curandum, quod Perseus fecit, ut *Medusa dormiens* inveniatur. Prudens enim belli susceptor semper fere hostem assequitur imparatum, et securitati propiorem. Denique in ipsis belli actionibus atque insultibus, ille *intuitus in speculum Palladis* adoperandus est. Plurimi enim ante ipsa pericula res hostium acute et attente introspicere possunt; at in ipso periculi articulo aut terrore offunduntur, aut pericula nimium præcipites et a fronte spectant; unde in illa temere ruunt, vincendi memores, vitandi obliti. At neutrum horum fieri debet; sed in speculum Palladis *cervice reflexa* inspiciendum, ut impetus recte dirigatur absque vel terrore vel furore.

A bello perfecto et victoria sequuntur effecta duo; *Pegasi* illa *generatio et exsuscitatio,* quæ satis evidenter *Famam* denotat, quæ per omnia volat, et victoriam celebrat, et reliquias belli faciles et in votum cedentes efficit. Secundum, *gestatio capitis Medusæ in scuto;* siquidem nullum præsidii genus huic ob præstantiam comparari possit. Unicum enim facinus insigne et memorabile, fœliciter gestum et perpetratum, omnes hostium motus obrigescere facit, atque malevolentiam ipsam stupidam reddit.

Exemplum tertium Philosophiæ secundum Parabolas antiquas, in Moralibus. *De Cupiditate, secundum fabulam* Dionysi.

NARRANT Semelem Jovis pellicem, postquam juramento eum inviolabili ad votum indefinitum obstrinxisset, petiisse ut ad amplexus suos accederet talis qualis cum Junone consuesset. Itaque illa ex conflagratione periit. Infans autem quem in utero gestabat, a patre exceptus, in femur ejus insutus est, donec menses fœtui destinatos compleret. Ex quo tamen onere Jupiter interim nonnihil claudicabat. Itaque puer, quod Jovem, dum in femore ejus portaretur, gravaret et pungeret, Dionysi nomen accepit. Postquam autem editus esset, apud Proserpinam per aliquot annos nutritus est; cum vero adultus esset, ore fere muliebri conspiciebatur, ut sexus videretur tanquam ambigui. Etiam extinctus et sepultus quondam erat ad tempus, et non ita multo post revixit. Atque prima juventa vitis culturam, atque adeo vini confectionem et usum, primus invenit et edocuit; ex quo celebris factus et inclytus orbem terrarum subjugavit, et ad ultimos Indorum terminos perrexit. Curru autem vehebatur a tigribus tracto; circa eum subsultabant dæmones deformes, Cobali vocati, Acratus et alii. Quin et Musæ comitatui ejus se adjungebant. Uxorem autem sibi sumpsit Ariadnem, a Theseo desertam et relictam. Arbor ei sacra erat hedera. Etiam sacrorum et cæremoniarum inventor et institutor habebatur; ejus tamen generis, quæ et fanaticæ erant et plenæ corruptelarum, atque insuper crudeles. Furores quoque immittendi potestatem habebat. Certe in orgyis ejus, a mulieribus furore percitis duo viri insignes discerpti narrantur, Pentheus et Orpheus; ille dum arbore conscensa spectator eorum quæ agerentur curiosus esse voluisset; hic cum lyram suaviter et perite pulsaret. Atque hujus dei res gestæ cum Jovis rebus fere confunduntur.

Fabula videtur ad *Mores* pertinere, ut vix quicquam in philosophia morali melius inveniatur. Describitur autem sub persona Bacchi natura *Cupiditatis*, sive affectuum et perturbationum animi. Primum igitur, quod ad *natalia* Cupiditatis attinet. Origo cupiditatis omnis, licet nocentissimæ, non alia est quam *Bonum Apparens.* Sicut enim virtutis mater est Bonum Existens, similiter cupiditatis mater est Bonum Apparens. Altera Jovis (sub cujus persona anima humana repræsentatur) uxor legitima, altera pellex; quæ tamen Junonis honores æmu-

letur, tanquam Semele. Concipitur vero Cupiditas in *voto illicito*, prius temere concesso quam rite intellecto et judicato. Atque postquam effervescere cœperit, *Mater* ejus (natura scilicet et species boni), ex *nimio incendio* destruitur et perit. Processus autem Cupiditatis a conceptu suo talis est. Illa ab *animo humano* (qui ejus est genitor) et nutricatur et occultatur, præcipue in *inferiori parte* ejus, tanquam *femore;* atque animum pungit et convellit et deprimit, adeo ut actiones et decreta ab ea impediantur et claudicent. Quinetiam postquam consensu et tempore confirmata est et in actus erumpit, ut jam quasi *menses compleverit* et edita plane sit atque nata, primo tamen ad tempus nonnullum apud *Proserpinam* educatur, id est *latebras quærit*, atque clandestina est, et quasi subterranea; donec remotis Pudoris et Metus frænis, et coälita audacia, aut virtutis alicujus prætextum sumit aut infamiam ipsam contemnit. Atque illud verissimum est, omnem affectum vehementiorem tanquam *ambigui sexus* esse. Habet enim impetum virilem, impotentiam autem muliebrem. Etiam illud præclare, *Bacchum mortuum reviviscere.* Videntur enim affectus quandoque sopiti atque extincti; sed nulla fides habenda est iis, ne sepultis quidem; siquidem præbita materia et occasione, resurgunt.[1]

De *Inventione Vitis* parabola prudens est. Omnis enim affectus ingeniosus est admodum et sagax, ad investigandum ea quæ ipsum alant et foveant. Atqui ante omnia quæ hominibus innotuere, *vinum* ad perturbationes cujuscunque generis excitandas et inflammandas potentissimum est et maxime efficax; atque est Cupiditatibus in genere instar *fomitis communis.* Elegantissime autem ponitur Affectus, sive Cupiditas, *provinciarum subjugator* et expeditionis infinitæ susceptor. Nunquam enim partis acquiescit, sed appetitu infinito neque satiabili ad ulteriora tendit, et novis semper inhiat. Etiam *tigres* apud Affectus stabulant, et ad *currum* eorum subinde *jugantur.* Postquam enim Affectus *curulis* esse cœperit, non *pedestris*, sed victor rationis et quasi triumphator factus sit, in omnes qui adversantur aut se opponunt crudelis est et indomitus ac immitis. Facetum autem est, quod circa currum Bacchi subsultant illi *dæmones* deformes

[1] Yet Rochefoucauld has said "Il est impossible d'aimer une seconde fois ce qu'on a véritablement cessé d'aimer."—*Reflexions Morales*, 294. [The two observations are not, I think, incompatible with one another. Bacon speaks of the appetite rather than the sentiment; and Rochefoucauld does not say that a man cannot love again that which he *thinks* he has ceased to love.—*J. S.*]

et ridiculi. Omnis enim affectus vehementior progignit motus in oculis et ore ipso et gestu indecoros et inconditos, subsultorios et deformes; adeo ut qui sibi ipsi fortasse in aliquo affectu (veluti ira, arrogantia, amore) videatur magnificus et tumidus, aliis tamen appareat turpis et ridiculus. Conspiciuntur autem in Cupiditatis comitatu *Musæ*. Neque enim reperitur ullus fere affectus tam pravus et vilis, cui non blandiatur aliqua doctrina. Hac enim in re ingeniorum indulgentia et procacitas Musarum majestatem in immensum minuit; ut cum duces vitæ et signiferi esse debeant, sint non raro cupiditatum pedissequæ et oblectatrices.

Inprimis vero nobilis est illa allegoria, Bacchum *amores* suos in eam effudisse, quæ ab alio *relicta* erat et fastidita. Certissimum enim est, affectus id petere atque ambire, quod *experientia* jampridem repudiavit. Atque norint omnes, qui affectibus suis servientes et indulgentes pretium potiundi in immensum augent (sive honores appetant, sive amores, sive gloriam, sive scientiam, sive alia quæcunque) se *res relictas* petere, et a compluribus per omnia fere sæcula post experimentum dimissas et repudiatas. Neque mysterio caret, quod *hedera* Baccho sacra fuerit. Hoc enim duplici modo convenit; primum quod hedera *hyeme virescat;* deinde quod circa tot res (arbores, parietes, ædificia) *serpat* ac circumfundatur et se attollat. Quod ad primum enim attinet, omnis cupiditas per *renitentiam* et vetitum et tanquam antiperistasin[1] (veluti per frigora brumæ hedera) virescit, ac vigorem acquirit. Secundo, affectus aliquis in humana anima prædominans omnes ejus actiones et decreta tanquam hedera *circumsepit;* neque fere quicquam purum invenias, cui illa claviculas suas non imprimat. Neque mirum est, si *superstitiosi ritus* Baccho attribuantur; cum omnis fere malesanus affectus in *pravis religionibus* luxurietur, adeo ut hæreticorum colluvies bacchanalia ethnicorum superarit; quorum etiam superstitiones non minus cruentæ quam turpes extiterunt. Neque itidem mirum est, si *furores* a Baccho immitti putentur; cum et omnis affectus in excessu suo veluti *furor brevis* sit, et si vehementius obsideat et incumbat, in insania sæpius terminetur. Illud autem de *Pentheo* et *Orpheo* inter *Orgya Bacchi* laceratis, evidentem parabolam habet; cum affectus quisque prævalidus erga duas res sit asperrimus atque infensissimus; quarum altera est

[1] See infra, p. 542.

inquisitio in eum curiosa, altera *admonitio salutaris* et libera. Neque auxilio fuerit, si illa inquisitio fiat tantum contemplationis aut spectandi gratia, tanquam arbore conscensa, absque omni animi malignitate; neque rursus, si admonitio illa multa cum suavitate et dexteritate adhibeatur; verum utcunque non tolerant *Orgya* aut *Pentheum* aut *Orpheum*. Postremo, illa *confusio personarum Jovis et Bacchi* ad parabolam recte traduci potest; quandoquidem res gestæ nobiles et claræ, atque merita insignia et gloriosa, interdum a *Virtute* et recta ratione et magnanimitate, interdum autem a *latente affectu* et occulta cupiditate (utcunque famæ et laudis celebritate utraque res pariter gaudeat) proveniant; ut non facile sit distinguere facta *Dionysi* a factis *Jovis*.[1]

Verum in theatro nimis diu moramur; transeamus ad palatium animi; cujus limina majori cum veneratione et cura ingredi convenit.

[1] It seems not improbable that Bacon was led to consider the ancient mythology from the point of view which he has illustrated both here and in the *Wisdom of the Ancients*, by an author with many of whose writings he was familiar. Plutarch's treatise *De Iside et Osiride* is very much in the same manner.

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LIBER TERTIUS.

AD REGEM SUUM.

CAPUT I.

Partitio Scientiæ in Theologiam, *et* Philosophiam. *Partitio* Philosophiæ *in Doctrinas tres; de* Numine, *de* Natura, *de* Homine. *Constitutio* Philosophiæ Primæ, *ut Matris Communis omnium.*

Historia omnis (Rex optime) humi incedit, et ducis potius officio quam lucis perfungitur; *Poësis* autem doctrinæ tanquam somnium: res dulcis, et varia, et volens videri aliquid in se habere divini; quod etiam somnia vendicant. Verum jam tempus est mihi ut evigilem, et me humo attollam, *Philosophiæ* et *Scientiarum* liquidum æthera secans.

Scientia aquarum similis est. Aquarum aliæ descendunt cœlitus, aliæ emanant e terra. Etiam Scientiarum primaria partitio sumenda est ex fontibus suis. Horum alii in alto siti sunt, alii hic infra. Omnis enim scientia duplicem sortitur informationem. Una inspiratur divinitus, altera oritur a sensu. Nam quantum ad illam quæ *docendo* infunditur scientiam, cumulativa ea est, non originalis; sicut etiam fit in aquis, quæ præter fontes primarios ex aliis rivulis in se receptis augescunt. Partiemur igitur scientiam in *Theologiam*, et *Philosophiam*. Theologiam hic intelligimus Inspiratam sive Sacram; non Naturalem, de qua paulo post dicturi sumus. At illam (Inspiratam nimirum) ad ultimum locum reservabimus, ut cum ea

sermones nostros claudamus; cum sit portus et sabbatum humanarum contemplationum omnium.

Philosophiæ autem objectum triplex, Deus, Natura, Homo; et triplex itidem Radius rerum; Natura enim percutit intellectum *radio directo;* Deus autem, propter medium inæquale (creaturas scilicet), *radio refracto;* Homo vero, sibi ipsi monstratus et exhibitus, *radio reflexo.*[1] Convenit igitur partiri Philosophiam in doctrinas tres; Doctrinam de *Numine*, Doctrinam de *Natura,* Doctrinam de *Homine.* Quoniam autem partitiones scientiarum non sunt lineis diversis similes, quæ coëunt ad unum angulum; sed potius ramis arborum, qui conjunguntur in uno trunco (qui etiam truncus ad spatium nonnullum integer est et continuus, antequam se partiatur in ramos); idcirco postulat res, ut priusquam prioris partitionis membra persequamur, constituatur una Scientia Universalis, quæ sit mater reliquarum, et habeatur in progressu doctrinarum tanquam portio viæ communis antequam viæ se separent et disjungant. Hanc Scientiam *Philosophiæ Primæ*, sive etiam *Sapientiæ* (quæ olim *rerum divinarum atque humanarum scientia* definiebatur), nomine insignimus. Huic autem scientiæ nulla alia opponitur; cum ab aliis scientiis potius limitibus intra quos continetur quam rebus et subjecto differat; fastigia scilicet rerum tantummodo tractans. Hanc ipsam utrum inter Desiderata reponere oporteat, hæsito; sed arbitror tamen poni debere. Equidem invenio farraginem quandam et massam inconditam doctrinæ ex Theologia Naturali, ex Logica, ex partibus quibusdam Physicæ (veluti de Principiis et de Anima) compositam et congestam; et sublimitate quadam sermonis, hominum qui seipsos admirari amant, tanquam in vertice scientiarum collocatam. Nos vero misso fastu id tantum volumus, ut designetur aliqua scientia, quæ sit receptaculum Axiomatum

[1] The parallel which naturally suggests itself between light and knowledge has by several writers been traced in the modifications of which light is susceptible. Thus Roger Bacon, at the close of his *Perspectiva*, likens vision by direct light to divine knowledge, by refracted light to angelic knowledge, and by reflected light to human; and again to man's knowledge in the state of glory "facie ad faciem," to his knowledge in the intermediate state, and to that which he has in this present life; "et hæc est recte per reflexionem, secundum quod dicit apostolus, Videmus nunc per speculum in ænigmate." And in this life also vision is triple. "scilicet recta in perfectis, fracta in imperfectis; et in malis et in negligentibus mandata Dei, est etiam per reflexionem"—an assertion in support of which he quotes S. James, i. 23. and 24. But all these illustrations differ from that in the text, inasmuch as they relate to the different kinds of knowledge which appertain to different orders and states of being, and not to the differences which arise from the nature of the object. For a nearer parallel, at least with respect to the radius reflexus, see Plutarch *De Curiositate*, c. 3.

quæ particularium scientiarum non sint propria, sed pluribus earum in commune competant.[1]

Plurima autem id genus Axiomata esse nemo ambigat. Exempli gratia, *Si inæqualibus æqualia addas, omnia erunt inæqualia*, regula est ex Mathematicis. Eadem et in Ethicis obtinet, quatenus ad justitiam distributivam; siquidem in justitia Commutativa, ut paria imparibus tribuantur ratio æquitatis postulat; at in distributiva, nisi imparia imparibus præstentur, iniquitas fuerit maxima.[2] *Quæ in eodem tertio conveniunt, et inter se conveniunt*, regula est itidem ex Mathematicis; verum simul tam potens in Logica, ut syllogismi sit fundamentum. *Natura se potissimum prodit in minimis*[3], regula est in Physicis tam valida, ut etiam Democriti atomos produxerit; veruntamen eam recte adhibuit Aristoteles in Politicis, qui contemplationem reipublicæ orditur a familia. *Omnia mutantur, nil interit*[4], regula itidem in Physicis, hoc modo prolata; *Quantum Naturæ nec minuitur nec augetur.* Eadem competit Theologiæ Naturali, sic variata; *Omnipotentiæ sunt opera, Aliquid ex nihilo facere, et Aliquid in nihilum redigere;* quod etiam Scriptura testatur, *Didici quod omnia opera quæ fecit Deus perseverent in perpetuum; non possumus eis quicquam addere, nec auferre.*[5] *Interitus rei arcetur per reductionem ejus ad principia*, regula est in Physicis; eadem valet in Politicis (ut recte notavit Machiavellus), cum illa quæ interitum rerumpublicarum maxime prohibent nihil aliud fere sint quam reformatio earum et reductio ad antiquos mores.[6] *Putredo serpens magis contagiosa est quam matura*[7], regula est in Physicis; eadem insignis etiam in Moralibus; cum homines profligatissimi et maxime facinorosi minus corruptelæ inferant publicis moribus quam qui aliquid videntur habere sanitatis et virtutis, et ex parte tantum mali sunt. *Quod conservativum est Formæ majoris, id activitate potentius*[8], regula est in Physicis; etenim, ut non abscindatur ipse rerum nexus, nec detur (ut loquuntur) vacuum, facit ad conservandam fabricam universi; ut vero gravia congregentur ad massam

[1] It is to principles of this kind that the title of *Axioms* is given by Aristotle. Bacon's first instance resembles that which Aristotle gives in the *Anal. Post.* i. 8. But most of his other instances are of a different character.

[2] See for the difference between distributive and commutative justice, the *Nicomachean Ethics*, v. cc. 3, 4, 5.

[3] This passage has been already quoted, Book II. c. 2.

[4] Ovid. Metam. xv. 165.

[5] Ecclesiast, iii. 14.

[6] Macchiav. Discorsi, iii. § 1.

[7] Vide supra, p. 466.

[8] This dictum is, I think, Bacon's own; at least I have not met with it.

terræ, facit ad conservandam tantum regionem densorum. Itaque prior motus posteriorem domat. Eadem tenet in Politicis; nam quæ faciunt ad conservandam ipsam politiam in sua natura validiora sunt quam quæ ad bene esse particularium in republica membrorum conducunt. Similiter eadem locum habet in Theologia; etenim in theologicis virtutibus, Charitas, quæ est virtus maxime communicativa, præ reliquis omnibus eminet. *Augetur vis agentis per antiperistasin contrarii*[1], regula est in Physicis. Eadem mira præstat in Politicis; cum omnis factio ex contraria ingruente vehementer irritetur. *Tonus discors in concordem actutum desinens concentum commendat*, regula est Musicæ. Eadem in Ethicis et Affectibus obtinet. Tropus ille Musicus, a *clausula* aut *cadentia* (quam vocant), cum jamjam adesse videatur, *placide elabendi*, convenit cum tropo Rhetorico *expectationem eludendi*. *Fidium sonus tremulus* eandem affert auribus voluptatem, quam lumen, aquæ aut gemmæ insiliens, oculis;

—— splendet tremulo sub lumine pontus.[2]

Organa sensuum cum organis reflexionum conveniunt; hoc in Perspectiva locum habet; oculus enim similis speculo[3], sive aquis; et in Acoustica; instrumentum enim auditus obici intra cavernam simile. Hæc pauca enumerasse sufficiet ad exempla. Quinimo Magia Persarum (quæ in tantum est celebrata) in eo potissimum versabatur, ut architecturas et fabricas rerum naturalium et civilium symbolizantes notaret.[4] Neque hæc omnia

[1] The doctrine of Antiperistasis, that is of the increase of intensity of one of two contraries by the juxtaposition of the other, is applied by Aristotle, *Meteor.* i. c. 13., in the case of heat and cold, to explain the formation of hail. It is formally and generally stated in Averroës's commentary on this passage. See also Arist. *Probl.* ii. 16., and Plutarch's *Quæst. Naturales.*

[2] Virg. Æn. vii. 9.

[3] That the word speculum is here used for "a glass" appears from the corresponding passage in the *Advancement of Learning.* This use of the word, though certainly uncommon, is sanctioned by the authority of C. Agrippa, who, distinguishing lenses from mirrors, calls the former "specula perspicua." See his celebrated work, *De incertitudine et vanitate scientiarum,*" with which Bacon seems, though he has spoken with undeserved contempt of its author, to have been familiar. The phrase used by S. Paul, "we see through a glass," is in the Vulgate "videmus per speculum," but it is at least doubtful whether in both versions it was not intended to suggest the idea of vision by reflected light; so that the authority of the English translators cannot be cited in support of Bacon's use of the word "speculum;" though on the other hand there are commentators who affirm that the word used in the original (ἐσόπτρου) means what in Latin is denoted by "speculare," in which case the vision δι' ἐσόπτρου is of course by transmitted light.

[4] The system of Zoroaster, with which we are but imperfectly acquainted, was at one time the subject of almost as many idle fancies as the philosophy of Hermes Trismegistus. The first idea of the connexion between the Persian magic and the art of government was suggested by the circumstance mentioned in the *Alcibiades* of

quæ diximus, et alia hujus generis, similitudines meræ sunt (quales hominibus fortasse parum perspicacibus videri possint), sed plane una eademque naturæ vestigia aut signacula, diversis materiis et subjectis impressa. Atque hæc res adhuc sedulo tractata non est. Invenias fortasse in scriptis quæ ab ingeniis celsioribus promanarunt hujusmodi Axiomata raro et sparsim inserta ex usu argumenti quod tractant; corpus vero aliquod talium Axiomatum quæ vim habeant quandam primitivam et summariam ad scientias, nemo composuit; cum tamen sit res ejusmodi, quæ insigniter naturam unam faciat; quod *Philosophiæ Primæ* munus esse autumant.

Est et alia hujus Philosophiæ Primæ pars, quæ si ad vocabula respicias, vetus est; si ad rem quam designamus, nova. Est autem inquisitio de *conditionibus adventitiis Entium* (quas *Transcendentes* dicere possumus), *Pauco, Multo; Simili, Diverso; Possibili, Impossibili;* etiam *Ente*, et *Non Ente;* atque ejusmodi. Quandoquidem enim ista sub Physica proprie non cadant, dissertatio autem Dialectica circa ea magis ad argumentandi rationes quam ad rerum existentiam sit accommodata, consentaneum omnino est ut hæc contemplatio (in qua non parum est dignitatis et utilitatis) haud deseratur prorsus, sed in scientiarum partitionibus nonnullum saltem inveniat locum. Veruntamen hoc intelligimus fieri debere longe alio, quam quo tractari solet, modo. Exempli gratia; nemo, qui de Multo et Pauco verba fecit, hoc egit ut causa reddatur cur alia in natura tam numerosa et ampla sint et esse possint, alia tam rara et modica; nam certe fieri non potest, ut in rerum natura tanta sit copia auri quanta ferri; tanta rosæ quanta graminis; tanta specificati quanta non-specificati.[1] Similiter nemo qui de Simili et Diverso disseruit, satis explicavit cur quasi perpetuo inter species diversas interponantur *participia* quædam, quæ sunt speciei ambiguæ; veluti muscus, inter putredinem et plantam; pisces qui hærent et loco non moventur, inter plantam et animal; sorices et mures, et alia nonnulla, inter animalia ex putredine et

Plato—that the princes of Persia were by the same persons instructed in politics and in magic. Thus the elder Mirandula observes, "Utriusque (Zoroastris et Zamolxidis) magia quid sit, Platonem si percontemur, respondebit in Alcibiade, Zoroastris magiam non esse aliud quam divinam scientiam, quâ filios Persarum regum erudiebant, ut ad exemplar mundanæ reipublicæ suam ipsi regere rempublicam edocerentur."—*Johannis Pici Mirandulæ Apologia.* (But compare J. F. Mirandula for an account of his uncle's change of opinion on this subject. Vide his *De Rerum Prænotione*, vii. c. 2.)

The reference to Plato in the passage I have quoted is rather an unscrupulous one, as Plato gives no information as to the nature of the Persian magic.

[1] Vide supra, note, p. 502.

ex semine prognata[1]; vespertiliones, inter aves et quadrupedes; pisces volantes (qui jam notissimi sunt), inter aves et pisces; phocæ, inter pisces et quadrupedes; et alia hujusmodi. Neque rursus causam indagavit quispiam, cur cum *similia similibus gaudeant*, ferrum ferrum non trahat, quod magnes facit; neque aurum ipsum aurum, licet argentum vivum alliciat. Circa hæc, et similia, in disceptatione de *Transcendentibus* illis altum est silentium; orationis enim apices, non rerum subtilitates, secuti sunt homines. Quamobrem horum *Transcendentium*, sive *conditionum Entium adventitiarum*, inquisitionem veram et solidam, secundum naturæ non sermonis leges, Philosophiam Primam recipere volumus. Atque de Philosophia prima (sive de Sophia) quam inter Desiderata haud immerito retulimus, hæc dicta sint.

CAPUT II.

De Theologia Naturali; *et Doctrina de* Angelis *et* Spiritibus, *quæ ejusdem est* Appendix.

Collocata igitur sua in sede Communi Scientiarum Parente, instar Berecynthiæ tanta gaudentis cœlesti sobole,

> Omnes cœlicolas, omnes supera alta tenentes;[2]

revertamur ad partitionem illam trium Philosophiarum, Divinæ, Naturalis, et Humanæ. Nam Theologia Naturalis, Philosophia etiam Divina recte appellatur. Diffinitur autem hæc, ut sit talis scientia, seu potius scientiæ scintilla, qualis de Deo haberi potest per lumen naturæ et contemplationem rerum creatarum; et ratione objecti, sane divina, ratione informationis, naturalis censeri potest. Hujus scientiæ limites ita vere signantur, ut ad atheismum confutandum et convincendum, et ad legem naturæ informandam, se extendant; ad religionem autem astruendam non proferantur. Quamobrem nec

[1] It is exceedingly difficult to ascertain what animals were generally supposed to be produced by equivocal generation. In a note on a passage in the *Novum Organum* (ii. 41.) I have collected some contradictory opinions on this question. That mice are mentioned as intermediate between the classes of animals which can and cannot be equivocally generated, is perhaps connected with Aristotle's having affirmed that by licking salt they breed without impregnation. This however does not affect the truth of the remark in the text; but it is worth while to notice that the aberrant types, as they are called, of any class often appear to connect that class with more than one other. E. g. the Monotremata and especially the Ornithorhynchus connect the Mammalia with Reptiles as well as with Birds.

[2] Virg. Æn. vi. 788.

Deus unquam edidit miraculum quo converteretur atheus; quia poterat ipso naturæ lumine ad notitiam Dei perduci; verum miracula ad convertendos idololatras[1] et superstitiosos designata sunt, qui numen agnoverunt sed in cultu ejus aberrarunt; quoniam non sufficit lumen naturæ Dei voluntati declarandæ, aut cultui ejus legitimo prodendo. Sicut enim opificis potentiam et peritiam ostendunt opera ejus, imaginem autem minime; sic opera Dei conditoris omnipotentiam et sapientiam ostendunt, imaginem ejus haudquaquam depingunt. Atque hac in re ethnicorum opinio a sacra veritate recedit. Illi siquidem mundum imaginem Dei statuebant, hominem mundi. At Sacræ Literæ haud tali honore mundum dignantur, ut Dei uspiam imago dicatur, sed solummodo opus manuum ejus; hominem vero imaginem Dei immediate substituunt. Quocirca, quod sit Deus, quod rerum habenas tractet, quod summe potens, quod sapiens et præscius, quod bonus, quod remunerator, quod vindex, quod adorandus, etiam ex operibus ejus demonstrari et evinci potest; et admirabilia complura secreta circa attributa ejus, et multo magis circa regimen et dispensationem super universum, etiam sobrie ex iisdem elici et manifestari queunt; estque istud argumentum a nonnullis utiliter pertractatum.[2] Verum ex intuitu rerum naturalium atque humanæ rationis principiis, de fidei mysteriis vel ratiocinari vel etiam suadere vehementius, aut rursus ea curiosius introspicere et ventilare et de modo mysterii inquirere, haud tutum meo judicio fuerit. *Da Fidei quæ Fidei sunt.* Nam vel ethnici, in illustri illa et divina de aurea catena fabula hoc ipsum concedunt, *quod Jovem de cœlo ad terras deducere nec homines potuerunt nec Dii; e contrario, quod Jupiter pertrahere eos potuerit e terra ad cœlum.*[3] Quare frustra sudaverit, qui cœlestia religionis arcana nostræ rationi adaptare conabitur. Decebit potius mentes nostras ad cœlestis veritatis thronum adorandum attollere. In hac igitur parte Theologiæ Naturalis, tantum abest ut defectum aliquem observem, ut excessum potius reperiam; ad quem subnotandum paulum sum digressus, propter maxima incommoda et pericula quæ ex eo tum religioni tum philosophiæ impendent; utpote qui et religionem

[1] *Idolatras* in the original.—*J. S.*

[2] This passage, and others to the same effect, show how far Bacon was from wishing to do away with natural theology, however much he was disposed to complain of the abusive employment of final causes.

[3] Vide supra, p. 487.

hæreticam procudet, et philosophiam phantasticam et superstitiosam.

Secus est quod ad Angelorum et Spirituum naturam attinet, quæ nec inscrutabilis est nec interdicta; ad quam etiam, ex affinitate quam habet cum anima humana, aditus magna ex parte est patefactus. Præcipit certe Sacra Scriptura, *Nemo vos decipiat in sublimitate sermonum, et religione Angelorum, ingerens se in ea quæ non novit.*[1] Attamen si hoc monitum diligenter perpendas, duo duntaxat in eo vetita reperies; adorationem scilicet, qualis Deo debetur, angelorum; et fanaticas de iis opiniones, vel ultra creaturæ sortem eos efferentes, vel ampliorem de iis cognitionem quam quis revera adeptus sit venditantes. Cæterum sobria circa illos inquisitio, quæ vel per rerum corporearum scalam ad eorum naturam pernoscendam ascendat, vel in anima humana veluti in speculo eam intueatur, neutiquam prohibetur. Idem de Spiritibus statuendum Immundis, qui a statu suo deciderunt.[2] Consortium cum iis atque usus operæ eorum illicitus est; multo magis qualiscunque cultus vel veneratio. At contemplatio et cognitio illorum naturæ, potestatis, illusionum, non solum ex locis Scripturæ Sacræ, sed ex ratione aut experientia, haud postrema pars est sapientiæ spiritualis. Sic certe Apostolus, *Stratagematum ejus non ignari sumus.*[3] Ac non minus Dæmonum naturam investigare in Theologia Naturali conceditur, quam venenorum in

[1] Coloss. ii. 4. and 18.

[2] The theory of angels and that of fallen spirits form a large and not very profitable chapter in every scholastic Summa Theologiæ. The dogmatic basis of these speculations consists chiefly of spiritualising interpretations (sanctioned by the Fathers and especially by S. Augustin) of certain texts of Scripture and of the supposed visions of Dionysius the Areopagite. The theory of the angelic nature (both in its first and in its fallen state) which the ingenuity of the schoolmen elaborated from these data, is a most remarkable instance of metaphysical creation; being no less than a determination of the conditions of thought and volition which exist among intelligences of a higher order than our own. That all such determinations are utterly unsatisfactory, both from the want of data and from the inherent and insurmountable difficulty of the problem to be solved, is not however to be denied.

I am not concerned to defend what the schoolmen have said upon the subject; but I may be allowed to mention in connexion with it an instance of the flippant ignorance with which they are often spoken of. It is said in the history of Martinus Scriblerus that they discussed the question whether angels know things best in the morning. The assertion is of course founded on an absurd mistake of the meaning of the inquiry, "utrum matutina cognitio potior sit quam vespertina." The doctrine of matutinal and vespertinal cognition the schoolmen derive from S. Augustin, and though neither its subtilty nor the eloquence with which it is expressed can prevent its being censured as an unauthorised speculation, yet no wise man will think it a matter to be jested with. I may refer with respect to it to Buonaventura's commentary on the second book of the *Sentences* of Peter Lombard: *Distinctio* 4: *Quæstio* 2. The "conclusio" is, "Angelus bonus habet cum matutina vespertinam quoque cognitionem, quæ non temporis sed dignitatis inter se habent ordinem."

[3] 2 Corinth. ii. 11.

Physica, aut vitiorum in Ethica. Hanc autem scientiæ partem de Angelis et Dæmonibus inter Desiderata numerare non licet, quippe quæ ab haud paucis sit tentata. Æquius esset, ut scriptorum in hoc genere pars haud parva aut vanitatis aut superstitionis aut subtilitatis inutilis arguantur.

CAPUT III.

Partitio Naturalis Philosophiæ, in Speculativam *et* Operativam: *quodque illæ duæ et in intentione tractantis, et in corpore tractatus, segregari debeant.*

Missa igitur Theologia Naturali (cui inquisitionem de Spiritibus, ut Appendicem attribuimus) accedamus ad secundam partem; videlicet illam de Natura, sive Philosophiam Naturalem. Optime Democritus, *Scientiam de Natura in profundis mineris sive puteis latere demersam.*[1] Non male Chymici, *Vulcanum alteram naturam esse; quinetiam id celeriter perficere, quod natura per ambages et temporis moras solet.*[2] Quidni igitur Philosophiam in duas partes secemus, Fodinam et Fornacem; et duo constituamus Philosophorum munera, Operarios in Mineris et Fabros? Sane utcunque videamur hæc per lusum loqui, tamen hujus generis partitionem utilissimam esse censemus, cum proponetur vocabulis familiaribus et scholasticis; hoc est, ut dividatur doctrina de Natura in *Inquisitionem Causarum* et *Productionem Effectuum; Speculativam* et *Operativam.* Altera naturæ viscera perscrutatur; altera naturam veluti super incudem efformat. Neque me fugit quam arcto copulentur vinculo Causæ et Effectus, ut explicationem eorum aliquatenus conjungi sit necesse. Attamen quandoquidem omnis solida et fructuosa Naturalis Philosophia duplicem adhibeat scalam, eamque diversam; *Ascensoriam* et *Descensoriam;* ab *Experientia* ad *Axiomata,* et ab *Axiomatibus* ad *nova Inventa;* consultissimum judico, ut hæ duæ partes, Speculativa et Operativa, et in intentione tractantis et in corpore tractatus separentur.

[1] See Diogen. Laert. in Pyrrho, c. 72.

[2] For a parallel between the Vulcanus Elementatus, who is nearly equivalent to the vis formatrix of nature, and the Vulcanus ignis, see Paracelsus's tract entitled *Meteororum*, c. 4.

CAPUT IV.

Partitio Doctrinæ Speculativæ de Natura, in Physicam Specialem, *et* Metaphysicam; *quarum Physica* Causam Efficientem *et* Materiam, *Metaphysica* Causam Finalem *et* Formam *inquirit. Partitio Physicæ in Doctrinas de* Principiis Rerum, *De* Fabrica Rerum *sive de* Mundo, *et de* Varietate Rerum. *Partitio Physicæ de Varietate Rerum in Doctrinam de* Concretis *et Doctrinam de* Abstractis. *Partitio* Doctrinæ de Concretis *rejicitur ad easdem Partitiones, quas suscipit Historia Naturalis. Partitio* Doctrinæ de Abstractis *in Doctrinam de* Schematismis Materiæ, *et Doctrinam de* Motibus. *Appendices duæ Physicæ Speculativæ,* Problemata Naturalia, Placita Antiquorum Philosophorum. *Partitio Metaphysicæ in Doctrinam de* Formis, *et Doctrinam de* Causis Finalibus.

Naturalis Philosophiæ partem, quæ Speculativa est et theoretica, in *Physicam Specialem* et *Metaphysicam* dividere placet. Atque in hac partitione attendant homines nos vocabulum *Metaphysicæ* usurpare sensu a recepto et vulgato discrepanti. Hic autem locus admonendi videtur de nostro, in genere, circa usum vocabulorum instituto. Id hujusmodi est, ut tam in præmisso vocabulo *Metaphysicæ* quam in aliis ubi conceptus et notiones nostræ novæ sunt et a receptis recedunt, maxima certe cum religione antiqua vocabula retineamus. Cum enim futurum speremus ut ordo ipse et dilucida rerum explicatio, quam subjungere conamur, nos a prava vocabulorum quibus utimur intelligentia liberent, in cæteris omnino avemus (quatenus sine veritatis ac scientiarum dispendio fieri possit) vel minimum ab antiquorum aut opinionibus aut loquendi more deflectere. Qua in re Aristotelis confidentiam proïnde subit mirari, qui impetu quodam percitus contradictionis et bellum universæ antiquitati indicens, non solum nova artium vocabula pro libitu cudendi licentiam usurpavit, sed etiam priscam omnem sapientiam extinguere et delere annisus est. Adeo ut neque nominet uspiam authores antiquos, neque dogmatum eorum mentionem ullam faciat, nisi quo aut homines perstringeret aut placita redargueret. Sane si famam nomini suo ac sequacium turbam affectaverit, hoc rationibus suis in primis accommodatum. Siquidem in veritate philosophica asserenda et recipienda, idem contingit quod in veritate divina; *Veni in nomine Patris, nec re-*

cipitis me; si quis venerit in nomine suo, eum recipietis.[1] Sed ex hoc cœlesti aphorismo, si quem præcipue designaverit spectemus, (nempe Antichristum, omnium sæculorum impostorem maximum,) colligere licet istud ipsum, *Venire in nomine suo,* nulla antiquitatis aut (si ita loqui licet) paternitatis habita ratione, rem mali ominis esse ad veritatem; utcunque eam sæpenumero comitetur illa fortuna, *Eum recipietis.* Cæterum de viro tam eximio certe et ob acumen ingenii mirabili, Aristotele, crediderim facile hanc ambitionem eum a discipulo suo accepisse, quem fortasse æmulatus est; ut si ille omnes nationes, hic omnes opiniones subigeret, et monarchiam quandam in contemplationibus sibi conderet. Quanquam fieri possit, ut apud aliquos tetricos et linguæ acerbæ simili cum discipulo suo titulo insigniretur,

> Felix terrarum prædo, non utile mundo
> Editus exemplum :[2]

eodem modo,

> Felix doctrinæ prædo, &c.

Nobis vero ex altera parte (quibus, quantum calamo valemus, inter vetera et nova in literis fœdus et commercium contrahere cordi est) decretum manet, antiquitatem comitari *usque ad aras,* atque vocabula antiqua retinere, quanquam sensum eorum et definitiones sæpius immutemus: secundum moderatum illum et laudatum in civilibus novandi modum, quo, rerum statu novato, verborum tamen solennia durent; quod notat Tacitus; *Eadem magistratuum vocabula.*[3]

Redeamus igitur ad acceptionem vocabuli *Metaphysicæ,* nostro sensu. Patet ex iis quæ supra disseruimus, disjungere nos Philosophiam Primam a Metaphysica, quæ hactenus pro re eadem habitæ sunt. Illam Communem Scientiarum Parentem,

[1] S. John, v. 43.

[2] This is a curious misquotation from Lucan. The original is—

> "Illic Pellæi proles vesana tyranni,
> Felix prædo, jacet, terrarum vindice fato
> Raptus; sacratis totum spargenda per orbem
> Membra viri posuere adytis. Fortuna pepercit
> Manibus, et regni duravit ad ultima fatum.
> Nam sibi libertas unquam si redderet orbem
> Ludibrio servatus erat—non utile mundo
> Editus exemplum, terras tot posse sub uno
> Esse viro." LUCAN. x. 21.

It is obvious that *terrarum* in the first line does not depend on *prædo,* but on *fato;* so that Bacon has changed not only the order of the words, but also the construction.

[3] Tac. Ann. i. 3. We see from this passage, how little Bacon had of the spirit of an iconoclast.

hanc Naturalis Philosophiæ Portionem posuimus. Atqui Philosophiæ Primæ, communia et promiscua Scientiarum Axiomata assignavimus. Etiam Relativas et Adventitias Entium Conditiones (quas Transcendentes nominavimus), Multum, Paucum; Idem, Diversum; Possibile, Impossibile; et hoc genus reliqua, eidem attribuimus: id solummodo cavendo, ut physice, non logice tractentur. At inquisitionem de Deo, Uno, Bono, Angelis, Spiritibus, ad Theologiam Naturalem retulimus. Merito igitur quæri possit quid tandem sit quod Metaphysicæ relinquatur? Certe ultra Naturam nihil; sed ipsius Naturæ pars multo præstantissima. Atque profecto, citra veritatis dispendium, huc usque de veterum sententia respondere liceat, Physicam ea tractare quæ penitus in materia mersa sunt et mobilia, Metaphysicam abstracta magis et constantia. Rursus, Physicam in natura supponere existentiam tantum et motum et naturalem necessitatem; at Metaphysicam etiam mentem et ideam. Nam huc forte redit ea quam dicemus res. Verum nos eam, missa sermonis sublimitate, perspicue et familiariter proponemus. Partiti sumus Naturalem Philosophiam in Causarum Inquisitionem et Productionem Effectuum. Inquisitionem Causarum in Theoricam conjecimus. Eam in Physicam et Metaphysicam partiti sumus. Ergo necesse est, ut vera differentia harum sumatur ex natura causarum quas inquirunt. Itaque absque aliqua obscuritate aut circuitione, *Physica* est quæ inquirit de *Efficiente* et *Materia*; *Metaphysica* quæ de *Forma* et *Fine*.[1]

[2] Physica igitur Causarum vaga et incerta et pro modo subjecti mobilia complectitur; Causarum constantiam non assequitur.

[1] The classification of causes here referred to is Aristotle's. In the first book of the *Metaphysics* he has applied it, with singular felicity, to the history of philosophical speculation. In order to apprehend its nature, it is necessary to take the word cause in a wider signification than is ordinarily done.

The efficient cause is that which acts — the material cause that which is acted on; as when the fire melts wax, the former is the efficient, the latter the material cause of the effect produced. The formal cause is that which in the case of any object determines it to be that which it is, and is thus the cause of its various properties; it is thus the "ratio essentiæ," the "λόγος τῆς οὐσίας." The final cause is that for the sake of which any effect takes place, whether the agent is or is not intelligent; semper enim *intenditur* finis, non autem semper *cognoscitur*. These four kinds of causes may be divided into two classes, extrinsic and intrinsic; the efficient and final belonging to the first class, the material and formal to the second. It is obvious that these distinctions involve the postulate of what has been called the theory of physical influence, that is, that one substance really acts on another, and must at least be modified if we adopt any such theory on this subject as that of Leibnitz or of Herbart.

[2] All that follows, as far as the end of the paragraph in p. 561., is an addition to the *Advancement of Learning*. — *J. S.*

> Limus ut hic durescit, et hæc ut cera liquescit,
> Uno eodemque igne.[1]

Ignis duritiei causa, sed in limo; ignis colliquationis causa, sed in cera. Partiemur autem Physicam in doctrinas tres. Natura enim aut collecta in unum, aut fusa et sparsa est. Colligitur vero in unum Natura, aut propter communia rerum omnium principia, aut propter unicam integralem universi fabricam. Itaque hæc Unio Naturæ duas peperit Physicæ partes: unam de Principiis Rerum, alteram de Fabrica Universi sive de Mundo, quas etiam *Doctrinas de Summis* appellare consuevimus. Tertia doctrina (quæ de natura sparsa sive fusa tractat) omnimodam rerum varietatem et summas minores exhibet. Ex his igitur patet tres omnino reperiri doctrinas physicas, de *Principiis Rerum*, de *Mundo* sive de *Fabrica Rerum*, et de *Natura multiplici* sive *sparsa;* quæ postrema (ut diximus) omnimodam rerum varietatem continet, estque veluti glossa prima aut paraphrasis circa naturæ interpretationem. Harum trium partium *desideratur* totaliter nulla; cæterum quam vere tractentur, non est hic diffiniendi locus.

At Physicam Sparsam, sive de Varietate Rerum, rursus in duas partes dividemus; Physicam de *Concretis*, et Physicam de *Abstractis;* sive Physicam de *Creaturis* et Physicam de *Naturis*. Altera (ut logicis vocabulis utamur) inquirit de substantiis, cum omni varietate suorum accidentium; altera de accidentibus, per omnem varietatem substantiarum. Veluti, si inquiratur de leone aut quercu, illa complura diversa accidentia suffulciunt: contra, si inquiratur de calore aut gravitate, illa plurimis distinctis substantiis insunt. Cum vero omnis Physica sita sit in medio inter Historiam Naturalem et Metaphysicam, prior pars (si recte advertas) Historiæ Naturali propior est; posterior Metaphysicæ. Physica autem *Concreta* eandem subit divisionem, quam Historia Naturalis; ut sit vel circa *Cœlestia*, vel circa *Meteora*, vel circa *Globum Terræ et Maris*, vel circa *Collegia Majora* quæ *Elementa* vocant, vel circa *Collegia Minora* sive *Species;* etiam circa *Præter-generationes*, et circa *Mechanica*. Etenim in hisce omnibus Historia Naturalis factum ipsum perscrutatur et refert, at Physica itidem causas: sed intellige hoc de *causis fluxis*, *Materia* scilicet et *Efficiente*. Inter hasce Physicæ portiones manca prorsus et imperfecta est ea, quæ inquirit de Cœlestibus, cum tamen

[1] Virg. Ecl. viii. 80.

propter nobilitatem subjecti præcipuæ hominibus curæ esse deberet. Etenim Astronomia fundata est in phænomenis non male; sed humilis est, et minime etiam solida: at Astrologia in plurimis etiam fundamento caret. Certe Astronomia talem offert humano intellectui victimam qualem Prometheus olim, cum fraudem Jovi fecit. Adduxit ille, loco bovis veri, pellem bovis, grandis et pulchri, stramine et foliis et viminibus suffarcinatam. Exhibet similiter et Astronomia exteriora cœlestium (astrorum dicimus numerum, situm, motus, periodos) tanquam pellem cœli, pulchram, et in systemata fabre concinnatam; at viscera desunt, (Rationes nempe Physicæ,) ex quibus (Hypothesibus Astronomicis adjunctis) eruatur theoria, non quæ phænomenis tantum satisfaciat (cujus generis complures ingeniose confingi possent), sed quæ substantiam et motum et influxum cœlestium, prout revera sunt, proponat. Explosa enim fere jampridem sunt illa, *Raptus Primi Mobilis*, et *Soliditas Cœli*, (stellis in orbibus suis tanquam clavis in laquearibus infixis). Nec multo melius asseritur, quod sint *diversi Poli* Zodiaci et Mundi; quod sit *Secundum Mobile* renitentiæ in adversum Primi Mobilis raptus; quod omnia in cœlo ferantur per *circulos perfectos;* quod sint *eccentrici* et *epicycli*, quibus motuum in circulis perfectis constantia servetur; quod a Luna in superius nulla sit *mutatio* aut *violentia;* et hujusmodi. Atque harum suppositionum absurditas in Motum Terræ Diurnum (quod nobis constat falsissimum esse) homines impegit. At vix quisquam est, qui inquisivit causas physicas tum de *substantia cœlestium* tam stellari quam interstellari; tum de *celeritate* et *tarditate* corporum cœlestium ad invicem; tum de *incitatione motus diversa* in eodem planeta; tum de *motuum consecutione* ab Oriente in Occidentem, aut e contra; deque *progressionibus, stationibus*, et *retrogradationibus;* tum de *motuum sublatione* et *casu* per apogæa et perigæa; tum de *motuum obliquatione*, vel per spiras se versus tropicos texendo et retexendo, vel per sinuationes quas Dracones[1] vocant; tum de *polis rotationum*, cur magis in tali parte cœli siti sint quam in alia; tum de *alligatione quorundam planetarum* ad distantiam certam a sole: hujus (inquam) generis inquisitio vix tentata est,

[1] The word Draco is mostly used with reference to the Moon's orbit, and denotes the two zones included between it and the ecliptic; the nodes being respectively the Caput and Cauda Draconis. The symbols which are still used both for the nodes of the moon's orbit and for those of other orbits seem derived from this use of the word Draco.

sed in mathematicis tantum observationibus et demonstrationibus insudatur. Eæ autem ostendunt quomodo hæc omnia ingeniose concinnari et extricari possint, non quomodo vere in natura subsistere; et motus tantum apparentes, et machinam ipsorum fictitiam et ad placitum dispositam, non causas ipsas et veritatem rerum indicant.[1] Quocirca non male Astronomia (qualis nunc habetur) inter Artes Mathematicas, non sine dignitatis suæ dispendio, numeratur; cum debeat potius (si proprias partes tueri velit) constitui Physicæ pars quasi nobilissima. Quicunque enim Superlunarium et Sublunarium conficta divortia contempserit, et *Materiæ Appetitus* et *Passiones* maxime *Catholicas* (quæ in utroque globo validæ sunt, et universitatem rerum transverberant) bene perspexerit, is ex illis quæ apud nos cernuntur luculentam capiet de Rebus Cœlestibus informationem, et ab iis e contra quæ in cœlo fiunt haud pauca de Motibus Inferioribus (qui nunc latent) perdiscet; non tantum quatenus hi ab illis regantur, sed quatenus habeant passiones communes.[2] Quamobrem hanc partem Astronomiæ, quæ Physica

[1] It is difficult to know what mode of investigation Bacon here intends to recommend. The problem of astronomy necessarily is, before any investigation as to the causes of the motions of the heavenly bodies can be undertaken, to determine what those motions really are. The distinction between real motions and apparent motions must be recognised before any progress can be made. And this distinction is not between a fact and a theory in the common acceptation of the words, but between a right theory and a wrong one. Bacon complains that the physical causes of the occasional immobility and regression of the planets have not been inquîred into: but in this complaint is involved the theoretic assumption that the planets really are stationary and really do regress. This assumption is made in order to account for their appearing to us to change the direction of their motion. It is the obvious explanation, but nevertheless a wrong one; and if the phenomena in question are not physical phenomena but optical, to what purpose is it to attempt to assign physical causes for them? And so in the other cases which he mentions. The value of any hypothesis for the explanation of the phenomena of course depends on its simplicity and its completeness, and the attempt to reduce all the celestial motions to perfect circles was at the time at which it was made a great step in advance; though the idea of circular motion was unduly retained when it was found to be producing not simplicity but complication. But consciously or unconsciously the mind is always introducing principles of arrangement (ideas or hypotheses) among the objects of its attention, and the error of the passage in the text is in effect the common one of assuming that the form of hypothesis with which the mind happens to be familiar is on that account an absolute fact. It is well to remark, as the Newtonian philosophy is often spoken of as the great result of Bacon's methods, that none of Newton's astronomical discoveries could have been made, if astronomers had not continued to render themselves liable to Bacon's censure.

[2] This prediction has been fulfilled by the history of physical astronomy, and the information gained respecting the "motus inferiores" may be divided into two parts, "quatenus hi ab illis regantur" and "quatenus habeant passiones communes." To the first belong the theory of the tides and those of precession and nutation, to the second that of the earth's figure, which depends on the law of universal gravitation, and which therefore may be said to be a result of our knowledge of celestial phenomena. The way in which what takes place in one part of the solar system is, so to speak, reflected in others, is one of the most interesting subjects in physical astronomy.

est, *desiderari* statuimus. Eam *Astronomiam Vivam* nominabimus, ad differentiam bovis illius Promethei suffarcinati, et solummodo figura tenus bovis.

At Astrologia multa superstitione referta est, ut vix aliquid sanum in ea reperiatur. Attamen eam potius expurgandam, quam prorsus abjiciendam esse censemus. Quod si quis hanc scientiam non in ratione aut contemplationibus physicis, sed in cæca experientia et complurium sæculorum observatione fundatam esse contendat, ideoque *rationum physicarum* examen rejiciat (quod jactabant Chaldæi), is eadem opera et auguria revocet, et aruspicinam et exta et omnigenas fabulas deglutiat; nam et hæc omnia ut diutinæ experientiæ et per manus traditæ disciplinæ dictamina fuisse asserebantur. Nos vero et ut Physicæ portionem Astrologiam recipimus, et non plus ei quam ratio et rerum evidentia concedit tribuimus; demptis superstitionibus et commentis. Ut vero rem paulo attentius introspiciamus: Primo quam inane illud commentum, quod singuli planetæ *vicissim per horas* regnent, ut spatio viginti quatuor horarum regna sua ter repetant, præter horas tres supernumerarias! Attamen hoc commentum nobis divisionem hebdomadæ (rem tam antiquam et tam late receptam) peperit; ut ex alternatione dierum manifestissime patet; cum in principio diei sequentis regnet semper planeta, a planeta prioris diei quartus; propter tres illas horas quas diximus supernumerarias.[1] Secundo, pro commento vano rejicere non dubitamus doctrinam de *Thematibus Cœli* ad *puncta temporis certa*, cum *distributione domorum;* ipsas scilicet Astrologiæ delicias, quæ bacchanalia quædam in cœlestibus exercuerunt. Nec satis mirari possumus viros quosdam egregios, et in Astrologia principes, tam levi ad ista astruenda argumento innixos esse; aiunt enim, quando illud prodat experientia ipsa, solstitia, æquinoctia, novilunia, plenilunia, et hujusmodi stellarum revolutiones majores manifesto et insigniter operari super corpora naturalia; necesse esse ut posituræ stellarum magis exactæ et subtiliores effectus quoque magis exquisitos et occultiores producant. Illi vero seponere primo de-

[1] This explanation of the origin of the names of the days of the week is given by Dio Cassius, xxxvii. c. 21. He also gives another which is free from an objection which has been alleged against the first; namely that the names are older than the division of the day into twenty-four hours. It is that the successive days were assigned to the respective planets which are fourth in order from each other, from some notion of analogy in the divine harmony to a musical progression by fourths. Joseph Scaliger, as quoted by Selden, deduces the order of progression from the properties of a heptagon inscribed in a circle. See on this subject a very learned essay by Archdeacon Hare in the first volume of the *Philological Museum.*

buerant operationes Solis per calorem manifestum; et similiter Lunæ vim quandam magneticam super incrementa æstuum semimenstrua; (nam fluxus et refluxus maris quotidianus alia res est;) his vero sepositis, reliquas planetarum vires super naturalia (quatenus experientia comprobantur) tenues admodum et infirmas et quasi latitantes reperient, etiam in revolutionibus majoribus. Quare contrario prorsus modo concludere debuerant; nimirum cum revolutiones illæ majores tam parum possint, exactas illas et minutas positurarum differentias nihil omnino virium obtinere. Tertio, *Fatalia* illa, quod hora nativitatis aut conceptionis fortunam fœtus regat, hora incœptionis fortunam incœpti, hora quæstionis fortunam rei inquisitæ, atque (ut verbo dicamus) doctrinas de *nativitatibus*, *electionibus*, et *quæstionibus*, et istiusmodi levitates, maxima ex parte nihil certi aut solidi habere, et rationibus physicis plane redargui et evinci judicamus. Illud igitur magis attinet dicere, quid tandem in Astrologicis retineamus aut probemus? atque in iis quæ probamus, quid desideremus? Nam hujus postremæ rei gratia (nempe ejus quod *desideratur*) sermonem hunc instituimus, cum alias censuris (ut sæpe diximus) non vacemus. Atque inter recepta certe doctrinam de *Revolutionibus* plus sanitatis quam reliqua habere censemus. Verum id optimum factu foret, si regulas quasdam præscribamus, ad quarum trutinam et normam Astrologica examinentur; ut utilia retineantur, rejiciantur inania. Prima ea sit, de qua jam ante monuimus *Revolutiones majores retineantur, valeant minores horoscoporum et domorum.*[1] Illæ instar tormentorum grandium ictus suos a longinquo jacere queant, hæ tanquam arcus minores spatia evadere et vires deferre non possunt. Secunda est; *Operatio cœlestium in corpora omnigena non valet, sed tantum in teneriora*, qualia sunt humores, aër, et spiritus; atque hic tamen excipimus operationes caloris solis et cœlestium, qui et ad metalla et ad plurima subterranea proculdubio penetrat. Tertia est; *Omnis operatio cœlestium potius ad massas rerum extenditur,*

[1] The heavens are in astrology divided into twelve compartments or houses, by means of six great circles which pass through the north and south points of the horizon, and divide the ecliptic into twelve equal portions. One of these circles coincides with the horizon, and the point of the ecliptic through which it passes at the moment of the nativity of the person whose destiny is to be ascertained, or of the commencement of the event whose fortunes are to be predicted, is called the horoscope. These divisions are spoken of by Sextus Empiricus, who with Julius Firmicus is our earliest authority on the subject of astrology. He seems rather to give the name of houses to definite signs of the Zodiac than to the divisions of which we have been speaking; a sense in which the term is also used by later writers.

quam ad individua; oblique tamen pervenit etiam ad individua nonnulla: illa scilicet, quæ ex individuis ejusdem speciei sunt maxime passibilia, et tanquam cera mollior; veluti cum constitutio aëris pestilens corpora minus resistentia occupat, magis resistentia præterit. Quarta est præcedenti non dissimilis; *Omnis operatio cœlestium non in puncta temporum aut angustias minutas, sed in spatia majora, defluit et dominatur.* Itaque prædictiones de temperaturis anni veræ esse possint; de diebus singulis, pro vanis merito habentur. Postrema est (quæ etiam prudentioribus astrologis semper placuit) quod *nulla insit astris fatalis necessitas;* sed quod inclinent ea potius quam cogant.[1] Addimus et illud (in quo in partes Astrologiæ, si fuerit emendata, non obscure venire videbimur) nimirum quod nobis pro certo constet, Cœlestia in se habere alios quosdam influxus præter Calorem et Lumen; qui tamen ipsi secundum regulas illas quas jam posuimus, et non aliter, valent. Verum illi in intima Physica latent, et longiorem dissertationem postulant. Visum est igitur nobis (his quæ diximus rite perpensis) inter Desiderata reponere Astrologiam his principiis nostris consentaneam; atque sicut Astronomiam quæ physicis rationibus nitatur, *Astronomiam Vivam* nominavimus; ita et Astrologiam quæ per easdem regitur, *Astrologiam Sanam* appellare placet. Circa quam recte conficiendam licet ea quæ diximus non parum profutura sint, pauca tamen addemus more nostro, quæ liquido proponent et ex quibus sit coagmentanda, et ad quæ adhibenda. Primo in Astrologiam Sanam recipiatur doctrina de *commixtionibus radiorum,* conjunctionibus scilicet et oppositionibus, et reliquis syzygiis sive aspectibus planetarum inter se. *Planetarum* autem *per signa zodiaci pertransitum* et *locationem sub iisdem signis* etiam huic parti, de commixtionibus radiorum, assignamus. Locatio enim planetæ sub signo est conjunctio quædam ejusdem cum stellis signi. Quinetiam sicut conjunctiones, ita et *oppositiones* et reliquæ *syzygiæ planetarum erga stellas signorum* notandæ sunt, quod adhuc plene factum non est. At commixtiones radiorum stellarum fixarum ad invicem utiles quidem sunt ad contemplationem de fabrica mundi, et regionum subjacentium natura; ad prædictiones minime, quia semper eodem modo se habent. Secundo, recipiantur *accessiones* singulorum planetarum propius *ad perpendiculum,* aut *recessiones* ab ipso,

[1] This gnome is commonly quoted from Ptolemy.

secundum regionum climata. Habent enim planetæ singuli non minus quam Sol, suas æstates, suas hyemes; in quibus fortius aut infirmius radios jaciant, propter rationem perpendiculi. Etenim nobis dubium non est, quin Luna posita in Leone fortius operetur super corpora naturalia apud nos, quam posita in Piscibus. Non quod Luna sub Leone ad cor respiciat, sub Piscibus ad pedes (sicut fabulantur); sed propter elevationem versus perpendiculum et approximationem ad stellas majores, eadem prorsus ratione qua et Sol.[1] Tertio, recipiantur *apogæa et perigæa planetarum*, cum debita disquisitione, ad quæ pertineat *planetæ vigor* in seipso, ad quæ *vicinitas* ad nos. Planeta enim in apogæo, sive exaltatione sua, magis alacer est; in perigæo autem, sive casu suo, magis communicat. Quarto, recipiantur (ut summatim dicamus) omnia reliqua *accidentia motus planetarum;* quales singulorum in itinere suo *accelerationes, retardationes, progressus, stationes, retrogradationes;* quales *distantiæ a Sole, combustiones, augmenta* et *diminutiones luminis, eclipses,* et si quæ sint alia. Etenim faciunt hæc omnia, ut planetarum radii vel fortius vel debilius, diversis denique modis et virtutibus, operentur. Atque quatuor ista ad *radiationes stellarum* spectant. Quinto, recipiantur quæ naturas stellarum, sive erraticarum sive fixarum, in propria sua essentia et activitate reserare et detegere ullo modo queant; qualis *magnitudo;* qualis *color* et *aspectus;* qualis *scintillatio* et *vibratio luminis;* qualis *situs versus polos* aut *æquinoctium;* quales *asterismi;* quæ *aliis stellis magis immixtæ,* quæ magis *solitariæ;* quæ *superiores,* quæ *inferiores;* quæ ex fixis *intra vias Solis et planetarum* (*Zodiacum* scilicet), quæ *extra;* quis ex planetis *velocior,* quis *tardior;* quis *moveatur in ecliptica,* quis *pervagetur in latitudine;* quis possit esse *retrogradus,* quis *minime;* quis *patiatur omnimodam distantiam a Sole,* quis *alligetur;* quis moveatur *celerius in apogæo,* quis in *perigæo;* denique *anomalia Martis, expatiatio Veneris,* et *labores* sive *passiones* admirandæ, quæ non semel et in Sole et in Venere deprehensæ sunt[2], et si quæ sint alia. Postremo, recipiantur etiam ex traditione, *naturæ et inclinationes planetarum* particulares, atque etiam *stellarum fixarum;* quæ, quandoquidem magno consensu tradantur, non leviter (præterquam ubi cum physicis rationibus plane discordant) rejiciendæ

[1] The reason which Bacon rejects seems to be nearly as conclusive as that which he admits.

[2] See the *Descriptio Globi Intellectualis,* for some account of these *passiones.*

sunt. Atque ex talibus observationibus coagmentatur *Astrologia Sana;* et secundum eas tantum Schemata Cœli et componere et interpretari oportet.

Adhibetur autem Astrologia Sana ad *prædictiones* fidentius, ad *electiones* cautius, ad utraque autem intra terminos debitos. Prædictiones fieri possint de *Cometis* futuris, qui (ut nostra fert conjectura) prænunciari possunt, et de omni genere *meteororum,* de *diluviis, siccitatibus, ardoribus, conglaciationibus, terræ motibus, irruptionibus aquarum, eruptionibus ignium, ventis et pluviis majoribus, anni variis tempestatibus, pestilentiis, morbis grassantibus, ubertate et caritate frugum, bellis, seditionibus, sectis, transmigrationibus populorum,* denique de omnibus rerum vel naturalium vel civilium *motibus* aut *innovationibus majoribus.* Ad magis autem *specialia,* et forte *singularia,* prædictiones istæ (licet minore certitudine) deduci possint, si repertis primo hujusmodi temporum inclinationibus generalibus, acri judicio vel physico vel politico applicentur illis speciebus aut individuis quæ hujusmodi accidentibus maxime sint obnoxia; veluti si quis ex præcognitione tempestatum anni, eas reperiet (exempli gratia) magis oleis quam vitibus, magis phthisicis quam hepaticis, magis incolis collium quam vallium, magis monachis quam aulicis (propter victus rationem diversam) propitias aut perniciosas; aut si quis ex cognitione influxus quem cœlestia habent super spiritus humanos, reperiat eum talem esse ut magis populis quam regibus, magis viris doctis et curiosis quam animosis et militaribus, magis voluptariis quam negotiosis aut politicis, faveat aut adversetur. Hujusmodi autem innumera sunt; sed (quemadmodum diximus) non tantum cognitionem illam generalem quæ sumitur ex astris (quæ sunt agentia) verum etiam particularem subjectorum (quæ sunt passiva) requirunt. Neque *Electiones* prorsus rejiciendæ sunt; sed parcius illis quam Prædictionibus fidendum. Videmus enim in plantationibus et seminationibus et insitionibus, ætatum lunæ observationes non esse res omnino frivolas. Sunt et multa ejus generis. Verum et Electiones istæ, etiam magis quam Prædictiones, per nostras regulas cohibendæ sunt. Atque illud semper attendendum; valere Electiones in illis tantum casibus, ubi et virtus cœlestium talis sit quæ non subito transeat, et actio inferiorum similiter talis quæ non statim absolvatur; quemadmodum fit in illis exemplis quæ memoravimus. Nam nec incrementa lunæ subito transiguntur, nec incrementa plantarum,

Punctualitas vero temporis omnino repudianda. Inveniuntur autem et talia complura (quod quis minus putet) in Electionibus circa civilia. Quod si quis nos compellat eo nomine, quod ex quibus ista Astrologia emendata elici possit, et rursus ad quæ utiliter adhiberi, aliquid monstravimus; quis vero sit eliciendi modus neutiquam docuimus; ille minus æquus fuerit, cum artem ipsam (cujus debitores non sumus) a nobis exigat. Hoc tamen circa illud ipsum quod petit monebimus; quatuor tantum esse modos, quibus ad hanc scientiam via sternatur. Primo, per *experimenta futura;* dein, per *experimenta præterita;* rursus, per *traditiones;* ultimo, per *rationes physicas.* Atque quod ad experimenta futura, quid attinet dicere? cum illa sæculis compluribus ad eorum copiam comparandam indigeant, ut de iisdem cogitationem suscipere frustra fuerit. Quod vero ad experimenta præterita; ea certe in manu hominum sunt; licet res sit laboriosa, et multi otii. Possint enim astrologi, (si sibi non desint,) omnes casus majores (veluti inundationes, pestilentias, prælia, seditiones, mortes regum, si placet, et similia,) ex historiæ fide depromere; et situm cœlestium, non secundum thematum subtilitatem sed juxta regulas eas revolutionum quæ a nobis adumbratæ sunt, qualis fuerit sub iisdem temporibus, intueri; ut ubi manifestus fuerit eventuum consensus et conspiratio, ibi *prædictionis* norma probabilis constituatur. Quatenus ad traditiones; eas ita ventilare oportet, ut quæ cum rationibus physicis manifesto pugnent e medio tollantur; quæ vero cum iis bene consentiant etiam authoritate sua valeant. Quantum denique ad physicas rationes; illæ maxime huic inquisitioni accommodatæ sunt, quæ de catholicis materiæ appetitibus et passionibus, et de motibus corporum simplicibus et genuinis inquirunt. His enim alis ad cœlestia ista materiata ascenditur tutissime. Atque de *Astrologia Sana* hactenus.

Insaniæ autem Astrologicæ (præter ea quæ a principio notavimus commenta) alia quædam portio superest non prætermittenda; quæ tamen ab Astrologia secludi solet, et in *Magiam* quam vocant *Cœlestem* transferri. Ea nacta est mirum commentum ingenii humani, nimirum ut *benevolus aliquis situs astrorum* in *sigillis* aut *signaculis* (puta metalli, aut gemmæ alicujus ad intentionem propriæ) excipiatur, quæ horæ ejus fœlicitatem alias prætervolaturam detineant, et quasi volatilem figant. Quemadmodum graviter ille conqueritur, de tam nobili apud antiquos arte jampridem amissa;

Annulus infuso non vivit mirus Olympo,
Non magis ingentes humili sub lumine Phœbos
Fert Gemma, aut celso divulsas cardine Lunas.[1]

Certe reliquias Sanctorum, earumque virtutes, recepit Ecclesia Romana; (neque enim in divinis et immateriatis fluxus temporis obest;) verum ut condantur reliquiæ cœli, quo hora quæ recessit et tanquam mortua est reviviscat et continuetur, mera est superstitio. Missa igitur hæc faciamus, nisi forte Musæ aniculæ jam factæ sint.

Physicam *Abstractam* in duas partes rectissime dividi posse statuimus; doctrinam de *Schematismis Materiæ*, et doctrinam de *Appetitibus et Motibus*. Utrosque cursim enumerabimus, unde veræ Physicæ de Abstractis adumbratio quædam deduci possit. Schematismi Materiæ sunt, *Densum, Rarum; Grave, Leve; Calidum, Frigidum; Tangibile, Pneumaticum; Volatile, Fixum; Determinatum, Fluidum; Humidum, Siccum; Pingue, Crudum; Durum, Molle; Fragile, Tensile; Porosum, Unitum; Spirituosum, Jejunum; Simplex, Compositum; Absolutum, imperfecte Mistum; Fibrosum atque venosum, Simplicis posituræ sive Æquum; Similare, Dissimilare; Specificatum, non Specificatum; Organicum, Inorganicum; Animatum, Inanimatum;* neque ultra rem extendimus. *Sensibile* enim et *Insensibile, Rationale* et *Irrationale*, ad doctrinam de *Homine* rejicimus. Appetituum vero et Motuum duo genera sunt. Sunt enim vel *Motus Simplices*, in quibus radix omnium naturalium actionum continetur, pro ratione tamen Schematismorum Materiæ; vel *Motus Compositi* sive producti, a quibus ultimis recepta philosophia (quæ parum de corpore naturæ stringit) auspicatur. Debent autem haberi hujusmodi Motus Compositi (quales sunt generatio, corruptio, et reliqui) pro pensis quibusdam aut Summis Motuum Simplicium, potius quam pro motibus primitivis. Motus Simplices sunt *Motus Antitypiæ*, quem vulgo motum ne fiat penetratio dimensionum vocant; *Motus Nexus*, quem motum ex fuga vacui appellant; *Motus Libertatis*, ne detur compressio

[1] I have not been able to discover whence these lines are taken. The notion they refer to gave rise to the word "Talisman," which seems to be a modification of the Greek word τέλεσμα, used like στοιχείωμα in the sense of a configuration of the heavenly bodies. See Salmasius *De Annis Climactericis*, and compare Von Hammer on Talismans, in the *Mines de l' Orient*. For this last reference I am indebted to the kindness of Mr. Scott, of Trinity College, Cambridge. See also Heyne, *Opuscula*, vol. 6., and the work to which he refers, namely the *Speculum Lapidum* of Camillus Leonardus, book 3rd. Some other references will be found in Le Roux de Lincy *Livre des Légendes*.

aut extensio præternaturalis; *Motus in Sphæram novam*, sive ad rarefactionem et condensationem; *Motus Nexus secundi*, sive ne detur solutio continuitatis; *Motus Congregationis Majoris*, sive ad massas connaturalium suorum, qui vulgo dicitur Motus Naturalis; *Motus Congregationis Minoris*, qui vulgo dicitur Sympathiæ et Antipathiæ; *Motus Disponens*, sive ut partes bene collocentur in toto; *Motus Assimilationis*, sive multiplicationis naturæ suæ super aliud; *Motus Excitationis*, ubi agens nobilius motum in alio latentem et sopitum excitat; *Motus Sigilli* sive *Impressionis*, operatio scilicet absque communicatione substantiæ; *Motus Regius*, sive cohibitio reliquorum motuum a motu prædominante; *Motus absque termino*, sive rotatio spontanea; *Motus Trepidationis*, sive Systoles et Diastoles, corporum scilicet quæ locantur inter commoda et incommoda; postremo *Decubitus*, sive *Exhorrentia Motus*, quæ etiam plurimarum rerum est causativa. Hujusmodi sunt *Motus Simplices*, qui ex penetralibus naturæ vere prodeunt; quique complicati, continuati, alternati, frænati, repetiti, et multis modis aggregati, *Motus* illos *compositos*, sive *Summas Motuum* quæ receptæ sunt, aut illis similes constituunt. *Summæ Motuum* sunt decantati illi motus, *Generatio, Corruptio; Augmentatio, Diminutio; Alteratio, et Latio;* etiam *Mixtio, Separatio; Versio.* Supersunt tantum tanquam Appendices Physicæ, *Mensuræ Motuum;* quid possit *Quantum*, sive *Dosis Naturæ?* Quid possit *Distantia*, id quod Orbis Virtutis sive Activitatis[1] non male vocatur? Quid possint *Incitatio* et *Tarditas?* Quid brevis aut longa *Mora?* Quid *Vis* aut *Hebetudo rei?* Quid *Stimulus Peristaseos?* Atque hæ sunt *Physicæ veræ de Abstractis* partes genuinæ. Etenim in Schematismis Materiæ, in Motibus Simplicibus, in Summis sive Aggregationibus Motuum, et in Mensuris Motuum, Physica de Abstractis absolvitur. Nam *Motum voluntarium in animalibus; Motum qui fit in actionibus sensuum; Motum phantasiæ, appetitus, et voluntatis; Motum mentis, decreti, et intellectualium;* ad proprias doctrinas amandamus. Illud tamen iterato monemus, universa hæc quæ diximus in Physica non ulterius tractari, quam ut inquirantur Materia et Efficiens ipsorum: retractantur enim in Metaphysica, quoad Formas et Fines.

Physicæ subjungemus *Appendices* insignes duas, quæ non tam ad materiam quam ad modum inquisitionis spectant; *Pro-*

[1] The allusion is to Gilbert. See note at p. 526.

blemata Naturalia, et *Placita Antiquorum Philosophorum*. Prior *Naturæ multiplicis*, sive *Sparsæ*, appendix est; secunda *Naturæ unitæ*, sive *Summarum*. Utraque ad solertem *Dubitationem* pertinet, quæ scientiæ pars est non contemnenda. Nam Problemata *particulares dubitationes* complectuntur; Placita *generales;* circa *Principia* et *Fabricam*. *Problematum* exemplum nobile est in libris Aristotelis: quod genus operis meruit certe, non solum ut posterorum laudibus celebraretur, verum etiam ut eorum laboribus continuaretur; cum Dubitationes indies oriantur novæ. Attamen in hac re adhibenda est cautio, magni utique momenti. Dubiorum commemoratio et propositio duplicem in se habet fructum: unum, quod Philosophiam muniat contra errores; quando id quod non plane liquet non judicatur aut asseritur (ne error errorem gigneret), sed suspenditur de eo judicium, et non fit positivum; alterum, quod Dubitationes, in codicillos relatæ, totidem spongiæ sunt, quæ incrementa scientiæ perpetuo ad se sugant et alliciant; unde fit ut illa quæ, nisi præcessissent Dubitationes, leviter et sicco pede transmissa fuissent, Dubitationum admonitu attente et studiose observentur. Verum hæ duæ utilitates vix unum compensant incommodum quod, nisi sedulo prohibeatur, se ingeret; nimirum quod Dubitatio, si semel admittatur tanquam justa et fiat quasi authentica, statim defensores in utramque partem suscitabit, qui etiam posteris eandem licentiam dubitandi transmittant; adeo ut homines ingenia sua intendant et applicent ad hoc, ut alatur potius Dubitatio quam terminetur aut solvatur. Cujus quidem rei exempla et in jurisperitis et in academicis ubique occurrunt, quibus moris est ut Dubitationem semel admissam perpetuam esse velint, nec minus *dubitandi* quam *asserendi* auctoramenta amplectantur: cum tamen ille demum sit ingenii usus legitimus, qui ex dubiis certa faciat, non qui certa in dubium vocet. Quare *Kalendarium Dubitationum*, sive *Problematum* in natura, et desiderari assero et suscipi probo; modo curæ sit, ut aucta scientia indies (quod fiet procul dubio, si nos audiant homines) quæ clare discussæ sint Dubitationes ex Albo deleantur. Huic *Kalendario* aliud addi cuperem, non minus utile: cum enim in omni inquisitione inveniantur hæc tria; *perspicue Vera, Dubia, perspicue Falsa;* utilissimum foret *Kalendario Dubiorum Kalendarium Falsitatum* et errorum popularium, vel in historia naturali vel in dogmatibus grassantium, adjungere; ne illæ amplius scientiis molestæ sint.

Quod ad *Placita Antiquorum Philosophorum*, qualia fuerunt Pythagoræ, Philolaï, Xenophanis, Anaxagoræ, Parmenidis, Leucippi, Democriti, aliorum, (quæ homines contemptim percurrere solent,) non abs re fuerit paulo modestius in ea oculos conjicere. Etsi enim Aristoteles, more Ottomanorum, regnare se haud tuto posse putaret, nisi fratres suos omnes contrucidasset[1]; tamen iis, qui non regnum aut magisterium sed veritatis inquisitionem atque illustrationem sibi proponunt, non potest non videri res utilis diversas diversorum circa rerum naturas opiniones sub uno aspectu intueri. Neque tamen subest spes, quod veritas aliqua purior ex illis aut similibus theoriis speranda ullo modo sit. Quemadmodum enim eadem phænomena, iidem calculi, et Ptolemæi principiis astronomicis et Copernici competunt; ita experientia ista vulgaris qua utimur, atque obvia rerum facies, pluribus diversis theoriis se applicare potest; ubi ad rectam veritatis indagationem longe alia severitate opus fuerit. Eleganter enim Aristoteles; *Infantes primo balbutientes quasvis mulieres appellare matres; post autem propriam matrem discernere*[2]; sic certe puerilis experientia omnem Philosophiam appellabit matrem; adulta vero matrem veram internoscet. Interea juvabit Philosophias discrepantes, veluti diversas *Naturæ glossas* (quarum una fortasse uno loco, alia alio est emendatior), perlegere. Optarim igitur ex Vitis Antiquorum Philosophorum, ex fasciculo Plutarchi de Placitis eorum, ex citationibus Platonis, ex confutationibus Aristotelis, ex sparsa mentione quæ habetur in aliis libris, tam ecclesiasticis quam ethnicis, (Lactantio, Philone, Philostrato, et reliquis,) opus confici cum diligentia et judicio de *Antiquis Philosophiis*. Tale enim opus nondum extare video. Atta-

[1] Bacon, it is probable, alludes particularly to a memorable and then recent instance of this practice. Mahomet III., on becoming Sultan in 1595, put to death nineteen of his brothers and ten or twelve women supposed to be with child by his father. Pope, perhaps unconsciously, has imitated Bacon. In the character of Addison, he speaks of him as one who could

"Bear, like the Turk, no brother near the throne."

It is worthy of remark that the practice in question was established as a fundamental law of the state by Mahomet the Second. I quote his words from the French edition of Von Hammer's *History of the Ottoman Empire*. "La plupart des légistes ont déclaré que ces de mes illustres fils ou petits-fils qui monteront au trône pourront faire exécuter leurs frères afin d'assurer le repos du monde—ils devront agir en conséquence."—*L'Histoire de l'Empire Ottoman*, iii. p. 302.

A little further on Von Hammer remarks that "la légalité du meurtre est consacrée non seulement pour les frères du Sultan mes encore pour ses neveux et ses petits-fils."

[2] Physic. i. c. 1.

men hic moneo, ut hoc fiat distincte, ita ut singulæ Philosophiæ seorsum componantur et continuentur; non per titulos et fasciculos (quod Plutarchus fecit) excipiantur. Quævis enim Philosophia integra seipsam sustentat, atque dogmata ejus sibi mutuo et lumen et robur adjiciunt; quod si distrahantur, peregrinum quiddam et durum sonant. Certe quando apud Tacitum lego facta Neronis aut Claudii, circumstantiis temporum, personarum, et occasionum vestita, nil video quod a probabilitate prorsus abhorreat; cum vero eadem lego in Suetonio Tranquillo, per capita et communes locos, minimeque in serie temporis repræsentata, portenta quædam videntur et plane incredibilia. Neque absimilis est ratio Philosophiæ, quando proponitur integra, et quando in frusta concisa et dissecta. Neque vero ex hoc *Placitorum Philosophiæ Kalendario* nuperas theorias et dogmata excludo; sicut illam Theophrasti Paracelsi, eloquenter in corpus quoddam et harmoniam philosophiæ redactam a Severino Dano [1]; aut Telesii Consentini, qui Parmenidis philosophiam instaurans arma Peripateticorum in illos ipsos vertit; aut Patricii Veneti, qui Platonicorum fumos sublimavit; aut Gilberti popularis nostri, qui Philolaï dogmata reposuit; aut alterius cujuscunque, si modo dignus sit. Horum vero (quoniam volumina integra extant) summæ tantum inde conficiendæ, et cum cæteris conjungendæ. Atque de *Physica* cum *Appendicibus* hæc dicta sint.

Quantum ad *Metaphysicam*, assignavimus jam ei inquisitionem *Causarum Formalium et Finalium;* quæ assignatio, quatenus ad *Formas*, incassum facta videatur. Invaluit siquidem opinio atque inveteravit *Rerum Formas essentiales*, seu *veras differentias*, nulla humana inveniri diligentia posse. Quæ opinio interim nobis elargitur atque concedit, *inventionem For-*

[1] Severinus was a Danish physician. He died in the year 1602, leaving several works on medical and philosophical subjects, in which he followed the opinions of Paracelsus. I am only acquainted with his *Idea Medicinæ Philosophicæ*, which there is reason to think Bacon had read. His writings are in point of style much superior to those of Paracelsus, who was however unquestionably a man of far more original genius.

Telesius's principal work is his *De Rerum Naturâ* [the first two books of which were published in 1565, and the whole in 1586]. Bacon derived more ideas from him than from any other of the "novelists," as he has somewhere called the philosophical innovators, and has written a separate treatise on three systems of philosophy, of which his is one. See the third volume of this edition.

Patricius attempted to amalgamate the Platonic and Aristotelian philosophies. His principal work entitled *Nova de Universis Philosophia* was published in 1591. It is not of much interest, but I shall have occasion to refer to it in connexion with Bacon's *De fluxu et refluxu maris.*

marum ex omnibus scientiæ partibus dignissimam esse quæ investigetur, si modo fieri possit ut reperiantur. Ad inventionis possibilitatem vero quod attinet, sunt certe ignavi regionum exploratores, qui ubi nil nisi cœlum et pontum vident, terras ultra esse prorsus negant. At manifestum est, Platonem, virum sublimis ingenii (quique veluti ex rupe excelsa omnia circumspiciebat[1]), in sua de Ideis doctrina *Formas esse verum scientiæ objectum* vidisse; utcunque sententiæ hujus verissimæ fructum amiserit, Formas penitus a Materia abstractas, non in Materia determinatas, contemplando et prensando; unde factum est, ut ad speculationes theologicas diverteret, quod omnem naturalem suam philosophiam infecit et polluit. Quod si diligenter, serio, et sincere ad actionem et usum oculos convertamus, non difficile erit disquirere et notitiam assequi quæ sint illæ Formæ, quarum cognitio res humanas miris modis locupletare et beare possit. Substantiarum enim Formæ (uno Homine excepto[2], de quo Scriptura, *Formavit hominem de limo terræ, et spiravit in faciem ejus spiraculum vitæ*[3], non ut de cæteris speciebus, *Producant aquæ, producat terra*[4]), species inquam creaturarum, (prout nunc per compositionem et transplantationem inveniuntur multiplicatæ,) ita perplexæ sunt et complicatæ ut aut omnino de iis inquirere frustra sit, aut inquisitio earum, qualis esse potest, seponi ad tempus, et postquam Formæ simplicioris naturæ rite exploratæ sint et inventæ, tum demum institui debeat. Quemadmodum enim nec facile esset, nec ullo modo utile, Formam soni investigare ejus qui verbum aliquod constituat; cum verba compositione et transpositione literarum sint infinita; at soni qui literam aliquam simplicem exprimat Formam inquirere (quali scilicet collisione, quali instrumentorum vocis applicatione, constituatur) comprehensibile est, imo facile; (quæ tamen Formæ literarum cognitæ ad Formas verborum illico nos deducent[5]:) eadem prorsus ratione

[1] Compare the phrase used by S. Augustine in speaking of the Platonists: "de silvestri cacumine videre patriam pacis, et iter ad eam non invenire."—*Confess.* vii. 21.

[2] Those who deny the cognoscibility of Forms admit of one exception, it being a received article of faith, to deny which is by the Clementine constitutions declared a heresy, that the rational soul is the substantial form of man; and it is to be observed that Bacon guards himself against being supposed to overlook this exception, in admitting that substantial forms are so "perplexed and complicated" as to be, for the present at least, hopeless subjects of inquiry.

[3] Gen. ii. 7. [4] Gen. i. 20. 24.

[5] There can be, I think, no doubt that the passage in the *Philebus* (p. 17. et infra of Stephens) in which Plato speaks of the analysis of sounds into their constituent

Formam inquirendo *leonis, quercus, auri,* imo etiam *aquæ* aut *aëris,* operam quis luserit: Formam vero inquirere *Densi, Rari; Calidi, Frigidi; Gravis, Levis; Tangibilis, Pneumatici; Volatilis, Fixi;* et similium tam *Schematismorum* quam *Motuum,* quos in Physica tractanda magna ex parte enumeravimus (et *Formas Primæ Classis* appellare consuevimus [1]), quique (veluti literæ alphabeti) numero haud ita multi sunt, et tamen Essentias et Formas omnium substantiarum conficiunt et sustinent [2]; hoc est, inquam, illud ipsum quod conamur; quodque eam partem Metaphysicæ de qua nunc inquirimus constituit et diffinit. Neque hæc officiunt, quominus Physica easdem naturas consideret quoque (ut dictum est), sed tantum quoad *causas fluxas.* Exempli gratia, si de *causa* inquiratur *Albedinis* in nive vel spuma; recte redditur, quod sit subtilis intermixtio aëris cum aqua. Hæc autem, longe abest, ut sit *Forma Albedinis,* cum aër etiam pulveri vitri aut crystalli intermixtus *albedinem* similiter procreet, non minus quam si admisceatur aquæ; verum *Causa Efficiens* illa tantum est, quæ nihil aliud quam vehiculum est Formæ.[3] At in Metaphysica si fiat inquisitio, hujusmodi quidpiam reperies; corpora duo diaphana intermixta, portionibus eorum opticis simplici ordine sive æqualiter collocatis, constituere Albedinem. Hanc Metaphysicæ partem desiderari reperio. Nec mirum; quia illo inquirendi modo qui huc usque in usum venit, nunquam in sæculum comparebunt *Rerum Formæ.* Radix autem mali hujus, ut et omnium, ea est; quod homines et propere nimis, et nimis longe, ab experientia et rebus particularibus cogitationes suas divellere et abstrahere consueverunt, et suis meditationibus et argumentationibus se totos dedere.

elements, and which is a "locus classicus" with reference to his method of induction, is here alluded to. See the General Preface, p. 26.

[1] So in the original. The sense seems to require (*et quorum formas* Formas Primæ Classis appellare consuevimus). See infra p. 568.—*J. S.*

[2] It clearly appears from this passage that Bacon's doctrine was that the forms of all substances might be determined by combining the results of a limited number of investigations of the forms of schematisms and motions, or as he elsewhere calls them of *simple natures.* (See *Novum Organum,* ii. 5.) For the phrase "Formæ primæ classis," see infra p. 568. The difficulty of effecting this combination might be insuperable; he did not profess to be able to decide à priori that it was not so; but at any rate it would be only a synthetical difficulty and would not present itself until his analysis of nature was completed and the forms of her constituent elements determined. Of the possibility of attaining these two ends—namely (1.) an analysis of nature resulting in the formation of a complete list of "naturæ simplices," and (2.) the determination of their forms—he seems never to have doubted.

[3] See Nov. Org. p. 270.

Usus autem hujus partis Metaphysicæ, quam Desideratis annumero, duas ob causas vel maxime excellit. Prima est, quod scientiarum omnium officium sit et propria virtus, ut experientiæ ambages et itinera longa (quantum veritatis ratio permittit) abbrevient; ac proinde remedium veteri querimoniæ afferant, de *Vita brevi et Arte longa.*[1] Illud vero optime præstatur, Axiomata scientiarum in magis generalia, et quæ omni materiæ rerum individuarum competant, colligendo et uniendo. Sunt enim Scientiæ instar pyramidum, quibus Historia et Experientia tanquam basis unica substernuntur; ac proinde basis Naturalis Philosophiæ est Historia Naturalis. Tabulatum primum a basi est *Physica;* vertici proximum *Metaphysica;* ad conum quod attinet et punctum verticale (*opus quod operatur Deus a principio usque ad finem*[2]*; summariam* nempe naturæ *legem*), hæsitamus merito, an humana possit ad illud inquisitio pertingere. Cæterum hæc tria veræ sunt Scientiarum contabulationes, suntque apud homines propria scientia inflatos et theomachos tanquam tres moles giganteæ:

> Ter sunt conati imponere Pelio Ossam,
> Scilicet atque Ossæ frondosum involvere Olympum:[3]

apud eos vero qui seipsos exinanientes omnia ad Dei gloriam referunt, tanquam trina illa acclamatio, *Sancte, Sancte, Sancte.* Sanctus enim Deus in multitudine operum suorum, sanctus in ordine eorum, sanctus in unione. Quare speculatio illa Parmenidis et Platonis, (quamvis in illis nuda fuerit speculatio,) excelluit tamen; *Omnia per scalam quandam ad unitatem ascendere.*[4] Atque illa demum scientia cæteris est præstantior,

[1] "Vita brevis, ars vero longa, occasio autem præceps, experimentum periculosum, judicium difficile."—*Hippocrates, Aph.* i. 1. I quote from Leonicenus's version.

[2] Eccles. iii. 11.

[3] Virg. Georg. i. 281.

[4] No such doctrine as this is to be found in the remains which have come down to us of the writings of Parmenides, and it is in effect inconsistent with what we know of his opinions. His fundamental dictum appears to have been that that which is, is one; incapable of change or motion. That visible things are in any sense parts or elements or attributes of the one immutable substance is, as far as we can judge, a later doctrine. To the question, what then are the phenomena of the visible universe, Parmenides gives no answer; unless we account as an answer what he says of their delusive and non-existent character. Even Plato was far from teaching the doctrine of an ascent to unity in the sense in which Bacon probably employed the terms. He no doubt adopted in his own sense the dictum of the Eleatæ, ἓν τὰ πάντα; but with him as with them mere phenomena have no true existence. In later writers however Bacon may easily have found expressions derived from the authority of Plato and Parmenides, and more consonant with his own views of the nature of the universe. But so far as they themselves were concerned, it may I think be safely stated that though the latter affirmed the ἑνότης of that which exists, no doctrine of ἕνωσις entered into his teaching; and that that which presents itself in the system of the former was

quæ humanum intellectum minimum multiplicitate onerat; quam liquet esse Metaphysicam[1], quippe quæ contemplatur præcipue *simplices illas rerum Formas* (quas superius *Formas Primæ Classis* nominavimus[2]); quandoquidem, licet numero paucæ, tamen commensurationibus et coordinationibus suis omnem varietatem constituunt. Secunda res, quæ hanc Metaphysicæ partem de Formis nobilitat, hæc nimirum est; quod potestatem humanam emancipet maxime et liberet, eamque in amplissimum et apertissimum operandi campum educat. Nam Physica per angustos et impeditos calles humanam operam dirigit, naturæ ordinariæ flexuosos tramites imitata; sed *latæ undique sunt sapientibus viæ;* Sapientiæ nimirum (quæ a veteribus *rerum divinarum et humanarum scientia*[3] diffiniebatur) mediorum copia et varietas semper suppetit. Causæ enim Physicæ novis inventis, *in simili materia,* lucem et ansam præbent. At qui Formam aliquam novit, novit etiam *ultimam possibilitatem superinducendi naturam illam in omnigenam materiam,* eoque minus inter operandum restringitur et alligatur vel ad *Materiæ Basim,* vel ad *Conditionem Efficientis.* Quod genus scientiæ eleganter describit etiam Salomon, etsi sensu magis divino; *Non arctabuntur gressus tui, et currens non habebis offendiculum.*[4] Intelligit scilicet Sapientiæ vias nec angustiis nec obicibus obnoxias esse.

Metaphysicæ pars secunda est *Finalium Causarum* inqui-

essentially different from Bacon's ascent to unity. The opinions of Parmenides would be more accurately indicated by the formula ἓν τὸ ὄν than by ἓν τὰ πάντα, or if the latter be employed, it should be understood to suggest the ellipsis of καλουμένα, — a remark apparently confirmed by Plato's expressions in the *Sophist*, p. 242, "Denique ut uno verbo complectar, Parmenides statuit simplex ens, sive τὸ ἁπλῶς ὄν, Platonici ens perfectum, sive τὸ παντελῶς ὄν, h. e. tale in quo sit una τῶν ὄντων πάντων complexio," — is Karsten's statement of the contrast between the doctrine of Parmenides himself, and that to support which he was cited as an authority. *Karsten's Parmenides*, p. 210.

[1] This passage resembles one in the *Metaphysics*, i. 2.; but I am not sure that the resemblance is more than accidental. Bacon, so far as I have observed, though he quotes Aristotle frequently, never refers to any passage in the *Metaphysics*.

[2] It is evident from this that the simple natures (the schematisms and motions) are not the "Formæ primæ classis;" although the literal interpretation of the passage referred to in the text would make it appear that they are so. For the simple natures are the proper objects of Physica Abstracta, and consequently are not identical with the Formæ primæ Classis, which are the subject of Metaphysica.

The "Formæ primæ Classis" are the *forms* of simple natures, and in the former passage (v. supra p. 566.) the clause between parentheses involves an anacoluthon, and refers not to that which immediately precedes it, but to the word "formam" at the beginning of the sentence. The construction would be regular if in this clause we were to replace the word "et" by "has autem" [or by "et quorum formas." The "simple natures" are the same in both passages; but Physica deals only with the material and efficient causes of them; Metaphysica with the formal and final causes.— *J. S.*]

[3] See Cicero, Tusc. Quæst. iv. 26.

[4] Proverbs, iv. 12.

sitio, quam non ut *prætermissam* sed ut *male collocatam* notamus. Solent enim inquiri inter Physica, non inter Metaphysica. Quanquam si ordinis hoc solum vitium esset, non mihi fuerit tanti. Ordo enim ad illustrationem pertinet, neque est ex substantia scientiarum. At hæc ordinis inversio defectum insignem peperit, et maximam philosophiæ induxit calamitatem. Tractatio enim *Causarum Finalium* in *Physicis* inquisitionem *Causarum Physicarum* expulit et dejecit; effecitque ut homines in istiusmodi speciosis et umbratilibus causis acquiescerent, nec inquisitionem causarum realium et vere Physicarum strenue urgerent; ingenti scientiarum detrimento. Etenim reperio hoc factum esse, non solum a Platone, qui in hoc littore semper anchoram figit; verum etiam ab Aristotele, Galeno[1], et aliis, qui sæpissime etiam ad illa vada impingunt. Etenim qui causas adduxerit hujusmodi, *palpebras cum pilis pro sepi et vallo esse ad munimentum oculorum;* aut *corii in animalibus firmitudinem esse ad propellendos calores et frigora;* aut *ossa pro columnis et trabibus a natura induci quibus fabrica corporis innitatur;* aut *folia arborum emitti quo fructus minus patiantur a sole et vento:* aut *nubes in sublimi fieri ut terram imbribus irrigent;* aut *terram densari et solidari ut statio et mansio sit animalium;* et alia similia; is in Metaphysicis non male ista allegarit, in Physicis autem nequaquam. Imo, quod cœpimus dicere, hujusmodi sermonum discursus (instar Remorarum, uti fingunt, navibus adhærentium) Scientiarum quasi velificationem et progressum retardarunt, ne cursum suum tenerent et ulterius progrederentur; et jampridem effecerunt ut Physicarum Causarum inquisitio neglecta deficeret ac silentio præteriretur. Quapropter Philosophia Naturalis Democriti et aliorum, qui Deum et Mentem a fabrica rerum amoverunt, et structuram universi infinitis naturæ prælusionibus et tentamentis[2] (quas uno nomine *Fatum* aut *Fortunam* vocabant) attribuerunt, et rerum particularium causas Materiæ necessitati sine intermixtione Causarum Finalium assignarunt, nobis videtur (quantum ex fragmentis et reliquiis

[1] See especially Galen's *De usu Partium*, which is in effect a treatise on the doctrine of final causes as exemplified in animal physiology. He calls the last book, which introduces the general considerations to which the subject leads, the Epode of the whole work; explaining that he does so, because the Epode is sung while the chorus stands at the altar of the deity.

[2] See in illustration of this phrase, Lucretius, v. 835. et seq., and infra note 2. at p. 682.

philosophiæ eorum conjicere licet) quatenus ad Causas Physicas, multo solidior fuisse et altius in naturam penetrasse quam illa Aristotelis et Platonis; hanc unicam ob causam, quod illi in Causis Finalibus nunquam operam triverunt; hi autem eas perpetuo inculcarunt. Atque magis in hac parte accusandus Aristoteles quam Plato, quandoquidem fontem Causarum Finalium, Deum scilicet, omiserit, et *Naturam* pro *Deo* substituerit; causasque ipsas Finales potius ut logicæ amator, quam theologiæ, amplexus sit. Neque hæc eo dicimus quod Causæ illæ Finales veræ non sint, et inquisitione admodum dignæ, in speculationibus Metaphysicæ; sed quia, dum in Physicarum Causarum possessiones excurrunt et irruunt, misere eam provinciam depopulantur et vastant. Alioquin, si modo intra terminos suos coerceantur, magnopere hallucinantur quicunque eas Physicis Causis adversari aut repugnare putent. Nam causa reddita, quod *palpebrarum pili oculos muniant*, nequicquam sane repugnat alteri illi, *quod pilositas soleat contingere humiditatum orificiis:*

Muscosi fontes, &c.[1]

Neque causa reddita, quod *coriorum in animalibus firmitudo pertinet ad cœli injurias propulsandas*, adversatur illi alteri, *quod illa firmitudo fit ob contractionem pororum in extimis corporum per frigus et deprædationem aëris;* et sic de reliquis: conspirantibus optime utrisque causis, nisi quod altera intentionem, altera simplicem consecutionem denotet. Neque vero ista res in dubium vocat Providentiam Divinam, aut ei quicquam derogat, sed potius eandem miris modis confirmat et evehit. Nam sicut in rebus civilibus prudentia politica fuerit multo altior et mirabilior, si quis opera aliorum ad suos fines et desideria abuti possit, quibus tamen nihil consilii sui impertit, (ut interim ea agant quæ ipse velit, neutiquam vero se hoc facere intelligant,) quam si consilia sua cum administris voluntatis suæ communicaret; sic Dei sapientia effulget mirabilius cum Natura aliud agit, Providentia aliud elicit, quam si singulis schematibus et motibus naturalibus Providentiæ characteres essent impressi. Scilicet Aristoteli, postquam naturam Finalibus Causis impregnasset, *Naturamque nihil frustra facere, suique voti semper esse compotem*[2] (*si impedimenta abessent*), et hujusmodi multa eo

[1] Virg. Ecl. vii. 45.

[2] See Arist. De Part. Anim. i. 13; Polit. i. 5; and many other passages.

spectantia posuisset, amplius Deo non fuit opus. At Democritus et Epicurus, cum atomos suos prædicabant, eousque a subtilioribus nonnullis tolerabantur; verum cum ex eorum fortuito concursu fabricam ipsam rerum absque Mente coäluisse assererent, ab omnibus risu excepti sunt. Adeo ut tantum absit ut Causæ Physicæ homines a Deo et Providentia abducant, ut contra potius philosophi illi qui in iisdem eruendis occupati fuerunt, nullum exitum rei reperiant nisi postremo ad Deum et Providentiam confugiant.[1] Atque hæc de *Metaphysica* dicta sint, cujus partem de *Causis Finalibus* in libris et Physicis et Metaphysicis tractatam non negaverim; in his recte, in illis perperam propter incommodum inde secutum.

CAPUT V.

Partitio Operativæ Doctrinæ de Natura, in Mechanicam *et* Magiam; *quæ respondent partibus Speculativæ: Physicæ Mechanica, Metaphysicæ Magia; et Expurgatio vocabuli Magiæ. Appendices duæ Operativæ;* Inventarium Opum Humanarum *et* Catalogus Polychrestorum.

OPERATIVAM de Natura similiter in duas partes dividemus, idque ex necessitate quadam. Subjicitur enim hæc divisio divisioni priori doctrinæ Speculativæ: *Physica* siquidem et inquisitio *Causarum Efficientium* et *Materialium* producit *Mechanicam;* at *Metaphysica* et Inquisitio *Formarum* producit *Magiam.* Nam *Causarum Finalium* inquisitio sterilis est, et tanquam virgo Deo consecrata nihil parit.[2] Neque nos fugit

[1] "C'est Dieu," affirms Leibnitz in a spirit not unlike that of the text, "qui est la dernière raison des choses et la connoissance de Dieu n'est pas moins le principe des sciences que son essence et sa volonté sont les principes des êtres." And a little further on he remarks that "les principes généraux de la Physique et de la Mécanique même dépendent de la conduite d'une intelligence souveraine, et ne sauraient être expliqués sans le faire entrer en considération. C'est ainsi qu'il faut réconcilier la piété avec la raison, et qu'on pourra satisfaire aux gens de bien qui apprehendent les suites de la philosophie mécanique ou corpusculaire, comme si elle pouvait éloigner de Dieu, et des substances immatérielles, au lieu qu'avec les corrections requises, et tout bien entendu, elle doit nous y mener."—*Lettre à Bayle*, p. 106. of Erdmann's edition.

[2] No saying of Bacon's has been more often quoted and misunderstood than this. Carrying out his division of the *Doctrina de Naturâ*, which as we have seen depends upon Aristotle's quadripartite classification of causes, he remarks that to Physica corresponds Mechanica, and to Metaphysica, Magia. But Metaphysica contains two parts, the doctrine of forms and the doctrine of final causes. Bacon remarks that Magia corresponds to Metaphysica, inasmuch as the latter contains the doctrine of forms, that of final causes admitting from its nature of no practical applications. "Nihil parit," means simply "non parit opera," which though it would have been a more

esse et Mechanicam sæpius mere empiricam et operariam, quæ a Physica non pendeat; verum hanc in Historiam Naturalem conjecimus, a Philosophia Naturali segregamus. Loquimur tantum de ea Mechanica, quæ cum Causis Physicis conjuncta est. Veruntamen intervenit quædam Mechanica, quæ nec prorsus operaria est, neque tamen philosophiam proprie attingit. Operum enim inventa omnia, quæ in hominum notitiam venerunt, aut casu occurrerunt et deinceps per manus tradita sunt, aut de industria quæsita. Quæ autem intentionaliter inventa sunt, illa aut per causarum et axiomatum lucem eruta sunt, aut per extensionem quandam vel translationem vel compositionem inventorum priorum deprehensa; quæ magis ingeniosa quædam res est et sagax, quam philosophica. Hanc vero partem, quam neutiquam contemnimus, non multo post, cum de *Experientia Literata* inter *Logica* tractabimus, cursim perstringemus. Enimvero Mechanicam, de qua nunc agimus, tractavit Aristoteles promiscue; Hero in Spiritalibus; etiam Georgius Agricola, scriptor recens, diligenter admodum in Mineralibus; aliique quamplurimi in subjectis particularibus[1]; adeo ut non habeam quod dicam de *omissis* in hac parte; nisi quod Mechanica promiscua, secundum exemplum Aristotelis, diligentius debuissent continuari per labores recentiorum, præsertim cum delectu eorum Mechanicorum, quorum aut causæ magis obscuræ aut effectus magis nobiles. Verum qui in hisce insistunt, quasi oras tantum maritimas perreptant,

——— premendo litus iniquum.[2]

precise mode of expression would have destroyed the appositeness of the illustration. No one who fairly considers the context can, I think, have any doubts as to the limitation with which the sentence in question is to be taken. But it is often the misfortune of a pointed saying to be quoted apart from any context, and consequently to be misunderstood.

[1] The *Mechanical Problems* of Aristotle are here referred to. Of Hero, an Alexandrian physicist, who flourished about B. C. [100], Fludd makes frequent mention, and it is perhaps on this account that he is here introduced. It is remarkable that no notice is taken of Archimedes who, beyond all comparison, was the greatest mechanical philosopher of antiquity. With his writings however there is reason to think that Bacon had no acquaintance, and in the *Historia Densi et Rari* his most popularly known invention, that of the method of detecting the adulteration of Hiero's crown, is mentioned in a manner which seems to show that Bacon did not distinctly apprehend the principle on which it depends. With contemporary scientific writers, Bacon seldom appears to be acquainted, and it is therefore less remarkable that no mention is made of Stevinus, Galileo, Guldinus, or Ghetaldus. Galileo's astronomical discoveries were of course more generally known than his mechanical researches.

The writings of Agricola, who has been called the German Pliny, are even now, it is said, of considerable value, and certainly entitle him to a high place among the scientific men of the 16th century. His greatest work is the *De re metallica*, in twelve books [published at Basle in 1555].

[2] Hor. Od. ii. 10.

Meo siquidem judicio vix possit aliquid in Natura radicitus verti aut innovari, vel per casus aliquos fortuitos, vel per tentamenta experimentorum, vel ex luce causarum physicarum, sed solummodo per *Inventionem Formarum.* Si igitur desiderari eam partem Metaphysicæ quæ de *Formis* agit posuimus, sequitur ut *Naturalis* etiam *Magia,* quæ ad eam est relativa, similiter desideretur. Verum hoc loco postulandum videtur, ut vocabulum istud *Magiæ,* in deteriorem partem jampridem acceptum, antiquo et honorifico sensui restituatur. Etenim *Magia* apud Persas pro sapientia sublimi, et scientia consensuum rerum universalium, accipiebatur[1]; atque etiam tres illi reges, qui ab Oriente ad Christum adorandum venerunt, *Magorum* nomine vocabantur. Nos vero eam illo in sensu intelligimus, ut sit scientia quæ cognitionem *Formarum Abditarum* ad opera admiranda deducat; atque, quod dici solet, *activa cum passivis conjungendo* magnalia naturæ[2] manifestet. Nam quantum ad Naturalem Magiam (quæ in libris plurimorum volitat[3]) credulas quasdam et superstitiosas traditiones et observationes de *Sympathiis et Antipathiis rerum,* atque de *occultis et specificis proprietatibus* complectentem, cum frivolis ut plurimum experimentis, potius occultandi artificio et larva quam reipsa admirandis; non erraverit sane, qui eam dixerit a scientia quam quærimus tantum distare, quoad veritatem naturæ, quantum libri rerum gestarum Arthuri ex Britannia, aut Hugonis Burdegalensis, et hujusmodi heroum umbratilium, differunt a Cæsaris Commentariis, quoad veritatem historicam. Manifestum enim est Cæsarem majora revera perpetrasse, quam illi de heroibus suis confingere ausi sunt, sed modis faciendi minime fabulosis. Hujusmodi doctrinas bene adumbravit Fabulæ de Ixione; qui cum Junonis, Potentiæ Deæ, concubitum animo sibi designaret, cum evanida nube rem habuit, ex quæ Centauros et Chimæras progenuit. Sic qui insana et impotenti cupiditate feruntur ad ea quæ per imaginationis tantum fumos et nebulas cernere se putant, loco operum, nil aliud quam spes inanes, et deformia quædam ac monstrosa spectra, suscipient. Hujus autem Magiæ Naturalis, levis et degeneris,

[1] See supra, p. 542.

[2] "Magnalia naturæ" is, it may be remarked, a favourite phrase with Paracelsus. The word magnalia occurs in the *Vulgate;* see Ps. cvi. 22., where our version is "wondrous works."

[3] See for instance the *Natural Magic* of G. B. Porta, published in [1589]; which quite deserves the character here given of the class to which it belongs.

operatio super homines similis est soporiferis quibusdam medicamentis, quæ somnum conciliant, atque insuper inter dormiendum læta et placentia somnia immittunt. Primo enim intellectum humanum in soporem conjicit, canendo proprietates specificas, et virtutes occultas et tanquam cœlitus demissas, et per traditionum susurros solummodo perdiscendas; unde homines ad veras causas eruendas et indagandas non amplius excitantur et evigilant, sed in hujusmodi otiosis et credulis opinionibus acquiescunt; deinde vero innumera commenta grata, et qualia quis optaret maxime, instar somniorum, insinuat. Atque operæ pretium est notare in illis scientiis, quæ nimium trahunt ex phantasia et fide (quales sunt *Magia* ista levis, de qua nunc loquimur, *Alchymia*, *Astrologia*, et aliæ consimiles), media sua et theoriam solere esse magis monstrosa, quam finis ipse est, et actio quo tendunt. Versio argenti, aut argenti vivi, aut alicujus alterius metalli, in aurum, res creditu dura; attamen longe verisimilius est, ab homine qui *Ponderis, Coloris flavi, Malleabilis et Extensibilis, Fixi* etiam et *Volatilis* naturas cognitas et perspectas habuerit, quique similiter prima mineralium semina et menstrua diligenter introspexerit, posse aurum multa et sagaci molitione tandem produci; quam quod pauca *Elixiris* grana, paucis momentis, alia metalla in aurum vertere valeant per activitatem ejusdem Elixiris, quæ naturam scilicet perficere et omni impedimento liberare possit. Similiter senectutis retardatio, aut gradus alicujus juventutis instauratio, non facile fidem reperiat; attamen longe verisimilius est, ab homine qui naturam *Arefactionis* et *spirituum super solida corporis deprædationes* bene norit; quique naturam *Assimilationis* atque *Alimentationis*, vel perfectioris vel pravioris, perspexerit; naturam etiam *spirituum* et quasi *flammæ corporis*, alias ad consumendum appositæ alias ad reparandum, notarit; posse per diætas, balnea, unctiones, medicinas proprias, accommodata etiam exercitia, et similia, vitam prolongari aut vigorem juventutis aliqua ex parte renovari; quam quod hoc fieri possit per guttas pauculas, aut scrupulos alicujus *pretiosi liquoris* aut *quintessentiæ*. Rursus, ex astris fata elici posse non statim aut facile homines consenserint; illa vero, quod Hora Nativitatis (quæ sæpissime ex pluribus accidentibus naturalibus vel acceleratur vel differtur) vitæ totius fortunam regat; aut quod Hora Quæstionis sit cum re ipsa quæ quæritur confatalis; meras nugas dixeris. Attamen tanta exercet hu-

manum genus impotentia et intemperies, ut non solum quæ fieri non possunt sibi spondeant, sed etiam maxime ardua sine molestia aut sudore, tanquam feriantes, se adipisci posse confidant. Verum de *Magia* hactenus; cujus et vocabulum ipsum ab infamia vindicavimus, et speciem veram a falsa et ignobili segregavimus.

Hujus vero partis, *Operativæ* scilicet de *Natura*, duæ sunt *Appendices*, magni utraque pretii. Prima est, ut fiat *Inventarium Opum Humanarum*, quo excipiantur et breviter enumerentur omnia hominum bona et fortunæ (sive sint ex fructibus et proventibus naturæ, sive artis) quæ jam habentur, et quibus homines fruuntur; adjectis iis quæ olim innotuisse constat, nunc autem perierunt; ad hunc finem, ut qui ad nova inventa accingitur, de jam inventis et extantibus negotium sibi non facessat. Hoc vero Inventarium magis erit artificiosum magisque etiam utile, si quæ communi hominum opinione *Impossibilia* reputantur in unoquoque genere adjunxeris; atque una *Proxima Impossibilibus*, quæ tamen habentur, copules; ut alterum humanam inventionem acuat, alterum quadantenus dirigat; utque ex his *Optativis* et *Potentialibus*, *Activa* promptius deducantur. Secunda est, ut fiat *Kalendarium eorum Experimentorum*, quæ maxime *Polychresta* sunt, et ad aliorum inventionem faciunt et ducunt. Exempli gratia; *experimentum artificialis conglaciationis aquæ* per glaciem cum sale nigro, ad infinita pertinet [1]; hoc enim modum condensationis secretum revelat, quo homini nihil est fructuosius. Præsto enim est ignis ad rarefactiones; verum in condensationibus laboratur. Plurimum autem facit ad inveniendi compendium, si hujusmodi *Polychresta* proprio Catalogo excipiantur.

[1] The artificial congelation of water by snow and salt Bacon has elsewhere spoken of as a recent discovery. I have not been able to ascertain by whom it was made. In Boyle's *New Experiments of Cold*, it is said to be familiarly made use of in Italy, though scarcely known in England; and in the collection of experiments published by the Florentine Academicians in 1667 (in which collection the celebrated "Florentine experiment," which is in reality due to Bacon, is contained), artificial congelations are spoken of, but (probably because the subject was commonly known) without any reference to the history of the invention. "Sal nigrum," it may be well to mention, is saltpetre.

CAPUT VI.

De magna Philosophiæ Naturalis, tam Speculativæ quam Operativæ, Appendice Mathematica; *quodque inter Appendices potius poni debet, quam inter Scientias Substantivas. Partitio Mathematicæ, in* Puram *et* Mixtam.

Optime Aristoteles, *Physicam et Mathematicam generare Practicam sive Mechanicam.*[1] Quare, cum jam tam Speculativam quam Operativam partem doctrinæ de Natura tractaverimus, locus est ut de *Mathematica* dicamus, quæ ad utramque est scientia auxiliaris. Hæc siquidem, in Philosophia recepta, Physicæ et Metaphysicæ pars tertia adjungitur; at nobis ista retractantibus et recolentibus, si eam ut scientiam substantivam et principalem designare in animo esset, magis consentaneum videretur et rei ipsius naturæ et ordinis perspicuitati, ut constitueretur tanquam portio Metaphysicæ. *Quantitas* enim (quæ subjectum est Mathematicæ) Materiæ applicata veluti Dosis Naturæ est, et plurimorum effectuum in rebus naturalibus causativa; ideoque inter *Formas Essentiales* numeranda est. *Figuræ* autem et *Numerorum* potentia in tantum apud antiquos valere visa est, ut Democritus *principia varietatis rerum* in *figuris atomorum* præcipue collocaverit; ac Pythagoras *naturam rerum ex numeris* constitui asseruerit. Illud interim verum est, Quantitatem inter Formas Naturales (quales nos eas intelligimus) omnium maxime esse abstractam, et a materia separabilem; quod ipsum in causa fuit, cur et diligentius exculta et acrius inquisita ab hominibus fuerit quam aliæ quæcunque Formæ, quæ omnes in materia magis sunt immersæ. Cum enim id hominum animis plane insitum sit (plurimo certe cum scientiarum detrimento) ut Generalium quasi *campis liberis* magis quam Particularium *silvis et septis* delectentur, nil repertum est Mathematicis gratius et jucundius, quo appetitus iste expatiandi et meditandi expleretur. Etsi autem hæc vera sint, nobis tamen qui non tantum veritati et ordini, verum etiam usui et commodis hominum consulimus, satius demum visum est *Mathematicas*, cum et in Physicis et in Metaphysicis et in Mechanicis et in Magicis plurimum polleant, ut omnium *Appendices* et copias auxiliares designare. Quod etiam quodammodo facere compellimur, propter delicias et fastum Mathe-

[1] Arist. Præf. ad Quæst. Mechan.

maticorum, qui hanc scientiam Physicæ fere imperare discupiant. Nescio enim quo fato fiat ut Mathematica et Logica, quæ ancillarum loco erga Physicam se gerere debeant, nihilominus certitudinem suam præ ea jactantes, dominatum contra exercere præsumant. Verum de loco et dignitate hujus scientiæ minus curandum, de re ipsa videamus.

Mathematica aut *Pura* est, aut *Mixta*. Ad Puram referuntur Scientiæ, quæ circa *Quantitatem* occupatæ sunt, a Materia et Axiomatibus physicis penitus abstractam. Eæ duæ sunt, Geometria et Arithmetica; Quantitatem altera Continuam, altera Discretam tractans. Quæ duæ artes magno certe cum acumine et industria inquisitæ et tractatæ sunt; veruntamen et Euclidis laboribus in Geometricis nihil additum est a sequentibus, quod intervallo tot sæculorum dignum sit; et doctrina de Solidis nec a veteribus nec a modernis pro rei usu et excellentia instructa et aucta est.[1] In Arithmeticis autem, nec satis varia et commoda inventa sunt Supputationum compendia, præsertim circa Progressiones, quarum in Physicis usus est non mediocris[2], nec Algebra bene consummata est[3]; atque Arithmetica illa Pythagorica et Mystica, quæ ex Proclo et reliquiis quibusdam Euclidis cœpit instaurari, expatiatio quædam speculationis est. Hoc enim habet ingenium humanum, ut cum

[1] We might here expect to find some mention of Archimedes and of Apollonius, whose labours contributed more to the progress of geometry than those of Euclid, who was rather a systematiser than an original discoverer, and whose Elements do not embrace the whole extent of the geometry of the Greeks. The doctrine of conic sections, which was commenced by Plato, and the method of limits of Archimedes, both most important portions of the Greek geometry, are of course not to be found in Euclid's Elements, not to mention a variety of isolated investigations. It is undoubtedly true that even long after Bacon's time geometry advanced more slowly beyond the limits it had attained in antiquity than other parts of mathematics, though in the present day it may be said to have become a new science. See on this head, the *Aperçu Historique des Méthodes de la Géométrie* of M. Chasles, himself one of those who have contributed the most to its recent progress.

[2] One would certainly not infer from this remark, to which there is nothing corresponding in the *Advancement of Learning*, that Bacon was aware that in the interval which had elapsed since its publication, the greatest of all inventions for facilitating arithmetical computations had been made known. Napier's *Logarithms* were published in 1614, and reprinted on the continent in 1620; in which year Gunter's *Canon of Triangles* was also published. In 1618 Robert Napier's account of his father's method and Briggs's first table of Logarithms were both published. In the year succeeding that of the publication of the *De Augmentis* his larger tables, and probably those of Wingate, made their appearance.

These dates are sufficient to show how much the attention of mathematicians was given to the subject. It would almost seem as if some one, possibly Savile, had told Bacon — what was no doubt true — that the application of the doctrine of series to arithmetical computation was not as yet brought to perfection, and that he had adopted the remark without understanding the importance of the discovery to which it referred, and perhaps without being aware that any such discovery had been made.

ad solida non sufficiat, in supervacaneis se atterat. Mixta habet pro subjecto *Axiomata* et *portiones physicas;* Quantitatem autem considerat, quatenus est ad ea elucidanda et demonstranda et actuanda auxiliaris. Multæ siquidem naturæ partes nec satis subtiliter comprehendi, nec satis perspicue demonstrari, nec satis dextre et certo ad usum accommodari possint, sine ope et interventu Mathematicæ. Cujus generis sunt Perspectiva, Musica, Astronomia, Cosmographia, Architectura, Machinaria[1], et nonnullæ aliæ. Cæterum in Mathematicis Mixtis integras aliquas portiones *desideratas* jam non reperio, sed multas in posterum prædico, si homines non ferientur. Prout enim Physica majora indies incrementa capiet, et nova Axiomata educet; eo Mathematicæ opera nova in multis indigebit, et plures demum fient Mathematicæ Mixtæ.

Jam autem doctrinam de Natura pertransivimus, et Desiderata in ipsa notavimus. Qua in re, si a priscis et receptis opinionibus discesserimus, eoque nomine contradicendi ansam cuiquam præbuerimus; quod ad nos attinet, ut dissentiendi studium longe a nobis abest, ita etiam et contendendi consilium. Si hæc vera sunt,

Non canimus surdis, respondent omnia silvæ;[2]

vox naturæ ingeminabit, etsi vox hominum reclamet. Quemadmodum autem Alexander Borgia dicere solebat de expeditione Gallorum Neapolitana, *eos venisse cum creta in manibus quo diversoria sua notarent, non cum armis ut perrumperent*[3]*;* sic nobis magis cordi est pacificus veritatis ingressus, ubi quasi creta consignentur animi qui tantam hospitem excipere possint, quam qui pugnax est, viamque sibi per contentiones et lites sternat. Absolutis igitur duabus partibus Philosophiæ, de *Numine* et de *Natura*, restat tertia de *Homine*.

[1] Machinaria means the art of making machines, not mechanics in the common sense of the word. It therefore appears from this enumeration that Bacon was not acquainted with any application of mathematics to statics or dynamics, as he would certainly not have included these fundamental portions of mixed mathematics in the nonnullæ aliæ with which the list concludes. The omission of any reference to the mathematical doctrine of motion is not surprising, though Galileo's researches were known for many years before the publication of the *De Augmentis;* the theory of equilibrium, however, is as old as the time of Archimedes; and we might therefore have expected that it would have been here mentioned.

[2] Virg. Ecl. x. 8.

[3] See Nov. Org. i. 35.

FRANCISCI BARONIS DE VERULAMIO,

VICE-COMITIS SANCTI ALBANI,

DE DIGNITATE ET AUGMENTIS SCIENTIARUM

LIBER QUARTUS.

AD REGEM SUUM.

CAPUT I.

Partitio Doctrinæ de Homine in Philosophiam Humanitatis *et* Civilem. *Partitio Philosophiæ Humanitatis in Doctrinam circa* Corpus Hominis *et Doctrinam circa* Animam Hominis. *Constitutio unius Doctrinæ generalis de* Natura *sive de* Statu Hominis. *Partitio Doctrinæ de Statu Hominis in Doctrinam de* Persona Hominis *et de* Fœdere Animi et Corporis. *Partitio Doctrinæ de Persona Hominis in Doctrinam de* Miseriis Hominis *et de* Prærogativis. *Partitio Doctrinæ de Fœdere in Doctrinam de* Indicationibus *et de* Impressionibus. *Assignatio* Physiognomiæ *et* Interpretationis Somniorum Naturalium *Doctrinæ de Indicationibus.*

Si quis me (Rex optime) ob aliquid eorum quæ proposui aut deinceps proponam impetat aut vulneret, (præterquam quod intra præsidia Majestatis tuæ tutus esse debeam,) sciat is se contra morem et disciplinam militiæ facere. Ego enim buccinator tantum, pugnam non ineo; unus fortasse ex iis de quibus Homerus,

Χαίρετε κήρυκες, Διὸς ἄγγελοι ἠδὲ καὶ ἀνδρῶν:[1]

hi enim inter hostes, etiam infensissimos et acerbissimos, ultro citroque inviolati ubique commeabant. Neque vero nostra buccina homines advocat et excitat ut se mutuo contradictio-

[1] Hom. Il. i. 334.

nibus proscindant, aut secum ipsi prælientur et digladientur; sed potius ut pace inter ipsos facta conjunctis viribus se adversus Naturam Rerum comparent, ejusque edita et munita capiant et expugnent, atque fines imperii humani (quantum Deus Opt. Max. pro bonitate sua indulserit) proferant.

Veniamus nunc ad eam scientiam ad quam nos ducit oraculum antiquum; nempe ad *scientiam nostri.* Cui, quo magis nostra intersit, eo incumbendum est diligentius. Hæc scientia Homini pro fine est scientiarum; at Naturæ ipsius portio tantum. Atque hoc pro regula ponatur generali; quod omnes scientiarum partitiones ita intelligantur et adhibeantur, ut scientias potius signent aut distinguant quam secent et divellant; ut perpetuo evitetur Solutio Continuitatis in Scientiis. Hujus etenim contrarium particulares scientias steriles reddidit, inanes, et erroneas; dum a fonte et fomite communi non aluntur, sustentantur, et rectificantur. Sic videmus Ciceronem oratorem de Socrate et ejus schola conquerentem, quod hic primus Philosophiam a Rhetorica disjunxerit; unde facta sit Rhetorica ars loquax et inanis.[1] Constat similiter sententiam Copernici de Rotatione Terræ (quæ nunc quoque invaluit), quia phænomenis non repugnat, ab Astronomicis Principiis non posse revinci; a Naturalis tamen Philosophiæ Principiis, recte positis, posse. Artem denique Medicam videmus, si a Naturali Philosophia destituatur, empiricorum praxi haud multum præstare. Hoc igitur posito, accedamus ad *Doctrinam de Homine.* Ea duplex est. Aut enim contemplatur Hominem segregatum, aut congregatum atque in societate. Alteram harum Philosophiam Humanitatis, alteram Civilem vocamus. Philosophia Humanitatis, sive Humana, ex partibus similibus illis, ex quibus Homo ipse, consistit; nempe ex scientiis quæ circa Corpus, et ex scientiis quæ circa Animam versantur. Verum priusquam distributiones particulares persequamur, constituamus scientiam unam generalem de Natura et Statu Hominis; digna enim certe res est ut emancipetur hæc scientia et in scientiam seorsum redigatur. Conficitur autem illa ex iis rebus quæ sunt tam corpori quam animæ communes. Rursus, hæc scientia de Natura et Statu Hominis distribui potest in duas partes; attribuendo alteri naturam hominis indivisam, alteri vinculum ipsum animæ et corporis; quarum primam doctrinam

[1] Cicero De Orat. iii. c. 19.

de Persona Hominis, secundam doctrinam de Fœdere vocabimus. Liquet autem hæc omnia, cum sint communia et mixta, primæ illi divisioni scientiarum circa Corpus et scientiarum circa Animam versantium assignari non potuisse.

Doctrina de Persona Hominis duas res præcipue complectitur; contemplationes scilicet de Miseriis Humani Generis, et de ejusdem Prærogativis sive Excellentiis.[1] Atque deploratio humanarum ærumnarum eleganter et copiose a compluribus adornata est, tam in scriptis philosophicis quam theologicis. Estque res et dulcis simul et salubris.

At illa altera de Prærogativis digna visa res nobis, quæ inter Desiderata proponatur. Elegantissime certe Pindarus (ut plerumque solet) inter laudandum Hieronem ait, *eum decerpere summitates ex omnibus virtutibus.*[2] Equidem plurimum ad magnanimitatem et humanum decus conferre posse putarem, si *ultimitates* (ut loquuntur Scholastici) sive *summitates* (ut Pindarus) humanæ naturæ colligerentur; præcipue ex historiæ fide; illud est, quid *ultimum* et *supremum* fuerit quo unquam humana natura per se ascenderit, in singulis et corporis et animi dotibus. Quanta res, quæ de Cæsare narratur, quod amanuensibus quinque simul *dictare* suffecerit? Quin et exercitationes illæ antiquorum rhetorum, Protagoræ, Gorgiæ; etiam philosophorum, Callisthenis, Posidonii, Carneadis,—ut de quovis themate in utramque partem ex-tempore disserere eleganter et copiose potuerint,—Ingenii Humani Vires haud parum nobilitant. Res autem usu minor, at ostentatione et facultate fortasse major, quam de Archia magistro suo memorat Cicero; *eum magnum numerum optimorum versuum, de iis rebus quæ tum agerentur, potuisse dicere ex-tempore.*[3] Tot millibus hominum nomina reddere potuisse Cyrum aut Scipionem, magnum *memoriæ* decus.[4] At virtutum moralium palmæ non minus celebres, quam intellectualium. Quantam rem in exercitio *patientiæ* exhibet historia illa vulgata de Anaxarcho, qui quæstioni et tor-

[1] Pascal has finely expressed the essential connexion which subsists between them. "Toutes ces misères," he remarks, speaking of man's life, "prouvent sa grandeur, ce sont misères de grand seigneur, misères d'un roi dépossédé."— *Pensées*, prem. partie.

[2] Pind. Olymp. i. 20.

[3] Cicero, pro Archiâ, c. 8.

[4] Xenophon says that Cyrus knew the names of all the officers (ἡγεμόνες) in his army; later writers go much farther, and affirm that he knew the names of all his soldiers. Compare Valerius Max. viii. 7. with Xenophon's statement, *Cyrop.* v. 3. The same exaggeration occurs in Solinus, c. 5.: "Cyrus memoriæ bono claruit, qui in exercitu cui numerosissimo præfuit nominatim singulos alloqueretur." The Scipio here mentioned is Lucius Scipio Asiaticus. Vide Solin. ubi sup. or Pliny, vii. 34.

mentis subjectus linguam (indicii spem) dentibus præscidit, et in os tyranni exspuit.[1] Neque tolerantia cedit (licet dignitate plurimum), quod sæculo nostro accidit in Burgundo quodam, Principis Aurasionensis interfectore.[2] Is virgis ferreis flagellatus et forcipibus ignitis laceratus, nullum prorsus gemitum edidit; quinetiam cum forte fractum aliquid desuper in caput adstantis cujuspiam incideret, ustulatus jam nebulo et in mediis tormentis risit; qui tamen paulo ante, cum cincinni capillitii quos gestabat tonderentur, fleverat. *Animi quoque mira serenitas et securitas, sub ipsum tempus mortis,* in pluribus enituit; qualis fuit illa centurionis apud Tacitum. Is cum a milite, qui eum ex imperato occisurus esset, juberetur ut cervices porrigeret fortiter, *Utinam* (inquit ille) *tu tam fortiter ferias.*[3] At Joannes Dux Saxoniæ, cum inter ludum scacchorum diploma, quo nex ejus in posterum diem mandabatur, allatum esset, adstantem quendam ad se vocavit, et subridens, *Specta,* inquit, *num non potiores partes ludi hujus teneam. Iste enim* (ad collusorem innuens), *me mortuo, jactabit suas potiores partes fuisse.*[4] Noster vero Morus, Angliæ Cancellarius, cum pridie quo moriturus esset tonsor ad eum veniret (missus scilicet ad hoc, ne forte capillitio promisso esset apud populum in spectaculo miserabilior) eumque interrogaret num tonderi placeret, renuit; atque ad tonsorem versus, *Mihi,* inquit, *cum rege de capite meo controversia est; antequam vero illa terminata fuerit, sumptus in illud non faciam.* Quin et idem, sub ipsum mortis articulum, postquam jam caput in truncum fatalem reclinasset, rursus se paululum erexit, et barba quæ ei erat promissior leniter amota, *At certe hæc,* inquit, *non offendit regem.* Verum, ne hoc loco longiores simus, satis patet quid velimus; nempe ut *Miracula Naturæ Humanæ,* viresque ejus et virtutes ultimæ, tam animi quam corporis, in volumen aliquod colligantur; quod fuerit

[1] The story is somewhat differently told by Diogen. Laert. ix. 59; but in Pliny and Valerius Maximus we find it related as in the text. A similar story is told of Leæna in Ælian's *Hist. Var.*

[2] The person referred to is Balthazar Gerard of Franche Comté, who shot William IX. Prince of Orange at Delft in 1584. Vide *Histoire Générale des Pays Bas,* v. 384.

[3] Tac. Ann. xv. 67. In the same spirit Giordano Bruno told his judges that it might well be that they had felt more fear in condemning him than he in hearing himself condemned.

[4] The Elector of Saxony, of whom this story is told, was, in 1547, irregularly condemned to death by Charles V. The sentence was not executed; and it seems doubtful whether the Emperor ever intended that it should be.

According to De Thou, the Elector, after making some remark on the Emperor's injustice, resumed and won the game.

nstar Fastorum de Humanis Triumphis. Qua in re institutum Valerii Maximi et C. Plinii probamus, diligentiam et judicium eorum requirimus.

Quantum ad doctrinam de Fœdere, sive de Communi Vinculo Animæ et Corporis, ea in duas partes tribui possit. Quemadmodum enim inter fœderatos intercedunt et mutua rerum suarum communicatio et mutua officia, sic fœdus istud animæ et corporis duabus similiter rebus continetur; nimirum ut describatur *quomodo hæc duo* (Anima scilicet et Corpus) *se invicem detegant; et quomodo invicem in se agant;* Notitia sive Indicatione, et Impressione. Harum prior (descriptio scilicet, qualis possit haberi notitia de anima ex habitu corporis, aut de corpore ex accidentibus animi) duas nobis peperit artes; utramque Prædictionis; inquisitionibus, alteram Aristotelis alteram Hippocratis, decoratam. Quanquam autem tempora recentiora has artes superstitiosis et phantasticis mixturis polluerint; repurgatæ tamen ac in integrum restitutæ, et fundamentum habent in natura solidum, et fructum edunt ad vitam communem utilem. Prima est Physiognomia, quæ per corporis lineamenta animi indicat propensiones; altera Somniorum Naturalium Interpretatio, quæ corporis statum et dispositionem ex animi agitationibus detegit. In harum priore, partem nonnullam desiderari perspicio. Siquidem Aristoteles ingeniose et solerter corporis fabricam, dum quiescit, tractavit; eandem in motu (nimirum gestus corporis) omisit; qui tamen non minus artis observationibus subjiciuntur, et majoris sunt usus.[1] Etenim lineamenta corporis animi inclinationes et propensiones generales ostendunt; oris autem et partium motus et gestus, insuper aditus et tempora et præsentis dispositionis et voluntatis signa declarant. Ut enim aptissimis atque elegantissimis Majestatis tuæ verbis utar, *Lingua aures ferit, gestus vero oculos alloquitur.*[2] Hoc vero bene norunt veteratores complures et astuti homines, quorum oculi in aliorum vultu et gestibus habitant, idque in commodum suum trahunt; utpote in quo facultatis et prudentiæ suæ pars maxima vertatur. Nec sane

[1] The physiognomical method of Aristotle consists chiefly in tracing the resemblances which exist between different kinds of animals and different individuals of the human species; a method followed by later writers, particularly G. B. Porta, and Lebrun, whose illustrations of his theory are well known, though the essay which they accompanied seems to have been lost.

[2] "For as the tongue speaketh to the eares, so doeth the gesture speake to the eyes of the auditour."— *Basilicon Doron*, book iii. *J. S.*

negari potest hoc ipsum simulationis in altero indicem esse mirificum, et monere homines optime de electionibus temporum et opportunitatum adeundi personas; quæ civilis prudentiæ pars est non parva. Nemo autem putet hujusmodi solertiam aliquid quidem valere circa homines individuos, sub regula autem non cadere; nam ad unum fere modum omnes ridemus, et ploramus, et erubescimus, et frontem contrahimus; et sic (ut plurimum) de motibus subtilioribus. Si quis autem hic Chiromantiæ meminit, sciat rem esse prorsus vanam, et in hujusmodi sermonibus quos tractamus nec dignam quidem quæ nominetur. Quod vero ad Somniorum Naturalium Interpretationem attinet, res est quorundam laboribus pertractata, sed plurimis ineptiis scatens. Illud tantum in præsentia innuo, basim illam huic rei quæ maxime est solida non substerni. Ea hujusmodi est: ubi idem fit ab interna causa quod fieri quoque solet ab externa, actus ille externus transit in somnium. Similis est stomachi oppressio ex crasso vapore, atque incubitu ponderis externi; itaque qui incubo laborant pondus sibi superimponi, magno cum apparatu circumstantiarum, somniant. Similis viscerum pensilitas[1] ex fluctuum agitatione in mari, et ex flatu circa præcordia collecto; itaque hypochondriaci sæpius navigationes et agitationes super aquas somniant. Sunt et innumera id genus.

Posterior pars doctrinæ Fœderis (quam Impressionem nominavimus) in artem nondum redacta est; sed obiter tantum et carptim inter alios tractatus aliquando intervenit. Illa eandem antistrophen cum priori habet. Quippe duo considerat: aut *quomodo, et quousque, humores et temperamentum corporis immutent animam, in eamque agant;* aut rursus, *quomodo et quousque animæ passiones vel apprehensiones immutent corpus, et in illud agant?* Horum prius in re medica interdum tractari videmus; at id ipsum se miris modis religionibus inseruit. Pharmaca enim præscribunt medici, quæ morbis animæ persanandis inserviant, ut in curationibus maniæ et melancholiæ; quinetiam medicinas porrigunt ad animum exhilarandum, ad cor muniendum, atque inde fortitudinem augendam, ad ingenium acuendum, ad memoriam roborandam, et similia. At diætæ, et delectus ciborum et potuum, et ablutiones, et aliæ circa corpus

[1] By "viscerum pensilitas" Bacon means their not being supported from below, but merely hanging from their attachments. See, in illustration of this phrase, the *Sylva Sylvarum* (733).

observantiæ, in secta Pythagoræorum, et in hæresi Manichæorum, et in lege Mahometi, omnem modum superant.[1] Ordinationes quoque legis cæremonialis sanguinis et adipis esum prohibentes, ac animalia munda ab immundis distinguentes (quatenus ad cibi usum), et plurimæ sunt et præcisæ. Imo Christiana fides ipsa (quamvis a cæremoniarum nube libera et serena) usum tamen retinet jejuniorum, abstinentiarum, et aliarum rerum quæ ad corporis macerationem et humiliationem spectant, tanquam rerum non mere ritualium sed etiam fructuosarum. Atqui radix omnium hujusmodi præceptionum (præter ipsam cæremoniam, et exercitium obedientiæ) in hac re consistit, de qua loquimur; nimirum, quod anima compatiatur corpori.[2] Si quis autem judicio infirmior existimet istas corporis in animam impressiones aut immortalitatem animæ in dubium revocare aut imperio animæ in corpus derogare, levi dubitationi leve responsum suffecerit. Exempla petat vel ab infante in utero matris, qui simul cum matris affectibus compatitur[3], et tamen e corpore matris suo tempore excluditur; vel a monarchis, qui, licet potentes, a servorum impetu quandoque flectuntur, salva interim majestate sua regia.

Jam quod ad partem reciprocam (de Anima et affectibus ejus in Corpus agentibus), illa quoque in medicina locum invenit. Nemo enim medicus est paulo prudentior, quin Accidentia Animi, ut rem maximi ad sanationes suas momenti, quæque omnia alia remedia plurimum vel adjuvet vel impediat, consideret et tractet. At aliud quidpiam, quod huc pertinet, parce admodum, nec pro rei vel subtilitate vel utilitate, inquisitum est; quatenus scilicet (missis affectibus) *ipsa imaginatio animæ, vel cogitatio perquam fixa, et veluti in fidem quandam exaltata, valeat ad immutandum corpus imaginantis?* Quamvis enim vim habeat ad nocendum manifestam, haud tamen inde sequitur pari potentia præditum esse ad subveniendum; non magis hercle quam si quis concluserit, quoniam reperitur aliquis aër ita pestilens ut subito interimat, debere quoque esse aliquem aërem ita salubrem ut decumbentem subito restituat. Atque

[1] All these are probably surpassed by the Institutes of Menu, so far as they relate to the way of life of the Brahmins.

[2] The difficulty of conceiving the nature of the reciprocal influence of the mind and body led to its being altogether rejected by Malebranche and by Leibnitz. See the *Theodicæa* of the latter for a statement of the three theories, namely that of physical influence, that of occasional causes, and that of pre-established harmony.

[3] Having probably, as S. Thomas Aquinas tells us, the same guardian angel. See his *S. T.* i. 113. 5.

hæc inquisitio nobilis profecto esset usus; verum (ut ait Socrates) *natatore Delio* indiget, quia mergitur in profundo.[1] Rursus inter has doctrinas de Fœdere, sive consensibus animæ et corporis, non alia fuerit magis necessaria quam illa disquisitio de Sedibus propriis et Domiciliis quæ singulæ Animæ Facultates habent in Corpore ejusque Organis. Quod genus scientiæ qui sectati fuerint, non desunt; sed quæ habentur in plerisque aut controversa sunt aut leviter inquisita; ut majori diligentia et acumine opus sit. Nam sententia introducta a Platone, qua Intellectus in Cerebro, tanquam in arce, collocatus est; Animositas (quam ille satis imperite Iracundiam vocavit, cum Tumori et Superbiæ sit propior) in Corde; Concupiscentia autem et Sensualitas in Jecinore; neque prorsus contemnenda est neque cupide recipienda.[2] Rursus, nec collocatio facultatum illarum intellectualium (Phantasiæ, Rationis, Memoriæ) secundum Ventriculos Cerebri, erroris expers est. Atque doctrinam de Natura Hominis indivisa, ac etiam de Fœdere Animi et Corporis, explicavimus.

CAPUT II.

Partitio Doctrinæ circa Corpus Hominis in Medicinam, Cosmeticam, Athleticam, *et* Voluptariam. *Partitio Medicinæ in Officia tria: viz. in* Conservationem Sanitatis, Curationem Morborum, *et* Prolongationem Vitæ: *quodque pars postrema de Prolongatione Vitæ disjungi debeat a duabus reliquis.*

Doctrina circa Corpus Hominis eandem recipit divisionem, quam bona corporis ipsius quibus inservit. Bona corporis humani quatuor sunt; Sanitas, Forma sive Pulchritudo, Vires, Voluptas. Totidem igitur scientiæ; Medicina, Cosmetica, Athletica, et Voluptaria, quam Tacitus appellat *eruditum luxum.*[3]

Medicina ars inprimis nobilis, et ex generosissima prosapia secundum poetas. Illi enim introduxerunt Apollinem primarium medicinæ deum; cui filium dederunt Æsculapium, deum

[1] Socrates is said to have remarked on a treatise by Heraclitus, that it required a Delian diver. The remark has, however, also been ascribed to Crates. See Diog. Laert. ii. 22. and ix. 12.

[2] See the Timæus, p. 71.

[3] Tac. Ann. xvi. 18.

itidem et medicinæ professorem; quippe cum Sol in naturalibus sit vitæ author et fons, Medicus ejusdem conservator et tanquam scaturigo altera. At decus longe illustrius accedit medicinæ ex operibus Servatoris, qui et animæ et corporis medicus fuit; et sicut animam doctrinæ suæ cœlestis, ita corpus miraculorum suorum, objectum veluti proprium constituit. Nusquam enim legimus miraculum aliquod ab eo patratum circa honores aut pecunias (præter unicum quo tributum redderetur Cæsari), sed tantum circa corpus humanum aut conservandum aut sustentandum aut persanandum.

Subjectum istud Medicinæ (Corpus nimirum Humanum) ex omnibus quæ natura procreavit maxime est capax remedii; sed vicissim illud remedium maxime est obnoxium errori. Eadem namque subjecti subtilitas et varietas, ut magnam medendi facultatem præbet, sic magnam etiam aberrandi facilitatem. Quocirca, quemadmodum ars ista (præsertim quo nunc habetur modo) inter præcipue conjecturales, ita inquisitio ejus reponenda est inter summe arduas et accuratas. Neque propterea cum Paracelso[1] et Alchymistis ita desipimus, ut putemus inveniri in corpore humano quæ singulis universitatis rerum speciebus (stellis, mineralibus, et aliis) respondeant, sicut illi fabulantur; leviter et crassa Minerva traducentes emblema illud veterum (quod homo esset *Microcosmus* sive epitome totius mundi) ad hoc commentum suum. Verum nihilominus huc res redit, ut (quod occœpimus dicere) non inveniatur inter corpora naturalia aliquod tam multipliciter compositum quam Corpus Humanum. Videmus enim herbas et plantas ex terra et aqua nutriri; animalia ex herbis et fructibus; Hominem vero ex carnibus ipsorum animalium (quadrupedum, avium, piscium); etiam ex herbis, granis, fructibus, succis et liquoribus variis; non sine multiplici commixtione, conditura, et præparatione horum corporum, priusquam homini sint in cibum. Adde quod animalibus vivendi modus sit simplicior, affectusque qui in corpus agant pauciores et ad unum fere modum operantes; ubi Homo locis habitationum, exercitationibus, affectibus, somno et vigiliis, vices prope infinitas variarum mutationum subit. Usque adeo verum est, unam inter res cæteras Corporis Humani massam maxime fermentatam et ex plurimis coagmentatam esse. At Anima contra substantiarum est simplicissima, ut non male cecinerit ille;

[1] See note 3. p. 339. — *J. S.*

—— purumque reliquit
Æthereum sensum, atque auraï simplicis ignem.[1]

Unde minime est mirandum, Animam sic collocatam requiem non invenire; juxta axioma illud, *Motum rerum extra locum esse rapidum, placidum in loco.* Verum ut ad rem redeamus. Varia ista et subtilis Corporis Humani compositio et fabrica effecit, ut sit instar organi musici operosi et exquisiti, quod harmonia sua facile excidit. Quare apud poëtas, summa ratione, Musica cum Medicina in Apolline conjungitur; quia similis fere sit utriusque artis Genius; atque in eo consistat plane medici officium, ut sciat humani corporis lyram ita tendere et pulsare ut reddatur concentus minime discors et insuavis. Ergo demum ista subjecti inconstantia et varietas artem reddidit magis conjecturalem; ars autem tam conjecturalis cum sit, locum ampliorem dedit non solum errori, verum etiam imposturæ. Siquidem omnes aliæ propemodum artes et scientiæ virtute sua et functione, non successu aut opere, judicantur. Advocatum ipsa agendi et dicendi facultas, non exitus causæ, commendat; gubernator navis clavi tenendi peritia, non expeditionis fortuna, se probat. At Medicus, et fortasse politicus, vix habent actiones aliquas proprias quibus specimen artis et virtutis suæ liquido exhibeant; sed ab eventu præcipue honorem aut dedecus reportant, iniquissimo prorsus judicio. Quotus enim quisque novit, ægroto mortuo aut restituto, item republica stante vel labante, utrum sit res casus an consilii? Fit itaque sæpissime ut impostor palmam, virtus censuram, referat. Quin ea est hominum infirmitas et credulitas, ut sæpenumero agyrtam aut sagam docto medico præponant. Quare poëtæ oculati plane et perspicaces fuisse videntur, cum Æsculapio Circem sororem dederunt, utrumque e Sole prognatum; sicut habetur in versibus; de Æsculapio Phœbigena,

Ille repertorem medicinæ talis et artis
Fulmine Phœbigenam Stygias detrusit ad undas;[2]

et similiter de Circe Solis filia,

Dives inaccessis ubi Solis filia lucis
Urit odoratam nocturna in lumina cedrum.[3]

Omnibus enim temporibus, fama et opinione vulgi, sagæ et aniculæ et impostores medicorum quodammodo rivales fuere, et

[1] Virg. Æn. vi. 747. [2] Virg. Æn. vii. 772. [3] Virg. Æn. vii. 11.

de curationum celebritate cum iisdem fere certarunt. Ex hoc dic sodes quid sequitur? Nempe ut medici ita secum, quemadmodum Salomon in re graviori, *Si unus et stulti et meus eventus erit, quid mihi prodest quod majorem sapientiæ dedi operam?*[1] Equidem medicis minus succenseo, si sæpenumero vacent alicui alteri studio quod adamant, magis quam arti suæ propriæ. Invenies etenim inter eos poëtas, antiquarios, criticos, rhetores, politicos, theologos, atque in iis artibus magis quam in professione propria eruditos. Neque hoc fit, ut arbitror, quia (ut quidam declamator contra scientias medicis objicit) habeant quæ sibi obversentur objecta tam fœda et tristia, ut animum ad alia abducere iis omnino sit opus; (nam qui homines sint *nihil humani a se alienum putent*[2]:) sed ob hoc ipsum de quo nunc agimus; nempe quod arbitrentur parum ipsis interesse vel ad existimationem vel ad lucrum, utrum artis suæ mediocritatem an perfectionem in ea majorem assequantur. Morbi enim tædia, vitæ dulcedo, spei fallacia, et amicorum commendatio, efficiunt ut homines facile in medicis qualibuscunque fiduciam collocent.[3] Verum si quis hæc attentius perpendat, ea potius ad culpam medicorum quam ad culpæ excusationem spectant. Neque enim spem abjicere, sed vires potius intendere debuerant. Nam si cui placet observationem expergefacere suam et paulatim circumspicere, etiam ex exemplis obviis et familiaribus facile deprehendet quantum obtineat imperii Intellectus Subtilitas et Acumen in varietatem sive Materiæ sive Formæ Rerum. Nil magis varium quam hominum facies et vultus; eorum tamen discrimina infinita retinet memoria; imo pictor ex pauculis colorum testis, acie oculi usus et vi phantasiæ et manus constantia, omnium facies qui sunt, fuerunt, atque etiam (si coram repræsentarentur) qui futuri sunt, penicillo imitari ac describere posset. Humana voce nil magis varium; hujus tamen discrimina in singulis personis facile internoscimus; quinetiam non desunt moriones et pantomimi quidam, qui quotquot libuerit reddere sciunt et ad vivum exprimere. Nil magis varium quam soni articulati, verba scilicet; via tamen inita est, ea reducendi ad paucas literas alphabeti. Atque illud verissimum est, non ex eo quod mens

[1] Eccles. ii. 15.

[2] Homo sum, humani nihil a me alienum puto."—*Ter. Heauton*, i. 1. 25.

[3] "Tant que les hommes mourront et aimeront à vivre," is the remark of a French writer, "le médecin sera raillé et bien payé."

humana sit minus subtilis aut capax, perplexitates et acatalepsias in scientiis plerumque provenire; sed ex eo potius, quod objectum nimis in remoto collocatum sit. Sicut enim sensus procul ab objecto dissitus plurimum fallitur, debite appropinquatus non multum errat; ita fit in intellectu. Solent autem homines naturam tanquam ex prælta turri et a longe despicere, et circa generalia nimium occupari; quando si descendere placuerit, et ad particularia accedere, resque ipsas attentius et diligentius inspicere, magis vera et utilis fieret comprehensio. Itaque hujus incommodi remedium non in eo solum est, ut organum ipsum vel acuant vel roborent, sed simul ut ad objectum propius accedant. Ideoque dubitandum non est quin si medici, missis paulisper istis generalibus, naturæ obviam ire vellent, compotes ejus fierent, de quo ait poëta,

> Et quoniam variant morbi, variabimus artes;
> Mille mali species, mille salutis erunt.[1]

Quod eo magis facere debent, quia philosophiæ ipsæ quibus innituntur medici, sive methodici sive chymici, (medicina autem in philosophia non fundata res infirma est,) parvi revera sunt. Quare si nimis generalia, licet vera forent, hoc vitium habeant, quod non bene homines ad actionem deducant; certe majus est periculum ab illis generalibus quæ in se falsa sunt, atque loco deducendi seducunt.

Medicina igitur (uti perspeximus) adhuc taliter comparata est, ut fuerit magis ostentata quam elaborata, etiam magis elaborata quam amplificata; cum labores in eam insumpti potius in circulo quam in progressu se exercuerint. Plurima enim in ea video a scriptoribus iterata, addita pauca. Eam in tres partes dividemus, quæ tria ejus officia nominabimus. Primum est Conservatio Sanitatis; secundum Curatio Morborum; tertium Prolongatio Vitæ. At istud postremum non videntur medici tanquam partem principalem artis suæ agnovisse, verum idem reliquis duobus satis imperite immiscuisse. Putant enim, si propulsentur morbi antequam ingruant, et curentur postquam invaserint, prolongationem vitæ ultro sequi. Quod licet minime dubium sit, tamen parum acute prospiciunt horum utrumque ad morbos tantum pertinere, et ad eam solummodo vitæ prolongationem quæ a morbis abbreviatur et intercipitur. Atqui filum

[1] Bacon here probably intentionally deviates from the original, in which the first line is, Et quoniam variant *animi*, variamus et artes. Vide Ovid. *Remed. Amor.* 525.

ipsum vitæ producere, ac mortem per resolutionem simplicem et atrophiam senilem sensim obrepentem ad tempus summovere, argumentum est quod nemo ex medicis pro dignitate tractavit. Neque vero subeat animos hominum ille scrupulus, ac si hæc res fato et Divinæ Providentiæ commissa in artis officium et munus jam primum a nobis revocaretur. Providentia enim proculdubio mortes quascunque, sive ex violentia sive ex morbis sive ex decursu ætatis, pariter regit; neque tamen ideo præventiones et remedia excludit. Ars autem et industria humana naturæ et fato non imperant, sed subministrant. Verum de hac parte paulo post dicemus; hæc tantum interea præfati, ne quis tertium istud officium medicinæ cum duobus prioribus (quod fere adhuc factus est) imperite confundat.

Quod ad officium *tuendæ sanitatis* attinet (ex officiis prædictis Medicinæ primum), multi de eo scripserunt, cum in aliis rebus satis imperite, tum nimium (ut arbitramur) delectui ciborum, minus quam par est quantitati eorum, tribuentes. Quin et in quantitate ipsa, tanquam philosophi morales, mediocritatem nimis laudarunt; cum et jejunia in consuetudinem versa et victus liberalis cui quis assueverit melius sanitatem tueantur quam istæ mediocritates quæ Naturam ignavam fere reddunt, neque excessus neque indigentiæ cum opus fuerit patientem. Exercitationum autem species quæ in sanitate tuenda plurimum pollent, nemo ex medicis bene distinxit aut annotavit; cum vix inveniatur aliqua inclinatio in morbum quæ non exercitatione quadam propria corrigi possit. Morbis renum globorum lusus convenit, pulmonum sagittatio, stomachi deambulatio et gestatio, atque aliis aliæ. Verum cum hæc pars, de Valetudinis Conservatione, secundum totum tractata sit, defectus minores persequi non est nostri instituti.

Quod vero ad *Curationem Morborum* attinet, illa demum pars est Medicinæ in qua plurimum laboris insumptum est, licet fructu satis tenui. Continet autem doctrinam de morbis quibus corpus humanum subjicitur; una cum eorundem causis, symptomatibus, et medelis. In hoc secundo officio medicinæ, multa sunt quæ desiderantur. Ex his pauca sed maxime insignia proponemus, quæ enumerasse satis duxerimus absque aliqua ordinis aut methodi lege.

Primum est, intermissio diligentiæ illius Hippocratis, utilis admodum et accuratæ, cui moris erat narrativam componere casuum circa ægrotos specialium; referendo qualis fuisset morbi

natura, qualis medicatio, qualis eventus.[1] Atque hujus rei nactis nobis jam exemplum tam proprium atque insigne, in eo scilicet viro qui tanquam parens artis habitus est, minime opus erit exemplum aliquod forinsecum ab alienis artibus petere; veluti a prudentia jurisconsultorum, quibus nihil antiquius quam illustriores casus et novas decisiones scriptis mandare, quo melius se ad futuros casus muniant et instruant. Istam proinde Continuationem Medicinalium Narrationum *desiderari* video; præsertim in unum corpus cum diligentia et judicio digestam; quam tamen non intelligo ita fieri debere amplam, ut plane vulgata et quæ quotidie obveniant excipiat (id enim infinitum quiddam esset, neque ad rem); nec rursus tam angustam, ut solummodo mirabilia et stupenda (id quod a nonnullis factum est) complectatur. Multa enim in modo rei et circumstantiis ejus nova sunt, quæ in genere ipso nova non sunt. Qui autem ad observandum adjiciet animum, ei etiam in rebus quæ vulgares videntur multa observatu digna occurrent.

Item in Disquisitionibus Anatomicis fieri solet, ut quæ corpori humano in universum competant, ea diligentissime usque ad curiositatem et in minimis quibusque notentur; at circa varietatem quæ in diversis corporibus reperitur, medicorum diligentia fatiscit. Ideoque Anatomiam Simplicem luculentissime tractari assero, Anatomiam Comparatam *desiderari* statuo. Partes enim singulas recte perscrutantur homines, earumque consistentias, figuras, situs; sed illarum partium diversam in diversis hominibus figuram et conditionem minus observant. Atque hujus omissionis causam non aliam esse arbitramur, quam quod ad primam inquisitionem inspectio unius aut alterius anatomiæ sufficere possit; ad posteriorem vero (quæ comparativa est, et casum recipit) necesse est ut plurimarum dissectionum attenta et perspicax observatio adhibeatur. Prior etiam res est, in qua homines docti in prælectionibus suis et in cœtu astantium se jactare possunt; at secunda ea est, quæ tacita et diutina experientia tantum acquiri potest. Illud interea minime dubium est, quod internarum partium figura et structura parum admodum externorum membrorum varietati et lineamentis cedat; quodque corda aut jecinora aut ventriculi tam dissimilia sint in hominibus, quam

[1] See Hippocrates *De Epidemiis*, of which however, only the first and third books appear to be his. The other five also contain a variety of cases.

aut frontes aut nasi aut aures. Atque in his ipsis differentiis partium internarum reperiuntur sæpius *causæ continentes*[1] multorum morborum; quod non attendentes medici humores interdum minime delinquentes criminantur; cum ipsa mechanica partis alicujus fabrica in culpa sit. In quorum morborum cura opera luditur, si adhibeantur medicinæ alterantes (quia res alterationem non recipit); sed emendanda res est, et accommodanda seu pallianda per victus regimen et medicinas familiares. Similiter, ad Anatomiam Comparatam pertinent accuratæ observationes tam humorum omnigenum, quam vestigiorum et impressionum morborum in corporibus variis dissectis. Etenim Humores in anatomiis tanquam purgamenta et fastidia fere prætermitti solent; cum tamen inprimis necessarium sit notare quales et quam multiplices sint humorum differentium species (non nimium in hac re tribuendo divisionibus eorum receptis) qui in corpore humano aliquando inveniantur; et in quibus cavitatibus et receptaculis quilibet ipsorum sedes et nidulos suos figere potissimum soleat; quoque juvamento, aut damno; atque his similia. Itidem vestigia et impressiones morborum, et interiorum partium ab iis læsiones et devastationes, in diversis anatomiis cum diligentia notanda; nempe apostemata, ulcera, solutiones continuitatis, putrefactiones, exesiones, consumptiones; rursus, contractiones, extensiones, convulsiones, luxationes, dislocationes, obstructiones, repletiones, tumores; una cum omnibus materiis præternaturalibus quæ in corpore humano inveniuntur (veluti calculis, carnositatibus, tuberibus, vermibus, et hujusmodi); hæc (inquam) omnia, et his similia, per eam quam diximus Anatomiam Comparatam et multorum medicorum experimenta in unum collata, magna cum cura perquiri et componi debent. At Varietas ista Accidentium in Anatomicis aut perfunctorie tractatur, aut silentio præteritur.

De illo vero altero defectu circa Anatomiam (nempe quod non fieri consueverit in *corporibus vivis*) quid attinet dicere? Res enim hæc odiosa et barbara, et a Celso recte damnata.[2] Neque tamen illud minus verum est (quod annotatum fuit

[1] This phrase is taken from Celsus: "Igitur hi qui rationalem medicinam profitentur hæc necessaria esse proponunt: Abditarum et morbos continentium causarum notitiam, deinde evidentium," &c. — *Celsus, Præfatio.*

[2] "Incidere autem vivorum corpora et crudele et supervacuum est." — *Celsus, Præfatio.*

a priscis) poros complures et meatus et pertusiones, quæ sunt ex subtilioribus, in anatomicis dissectionibus non comparere; quippe quæ in cadaveribus occluduntur et latent; cum in viventibus dilatentur, et possent esse conspicui.[1] Itaque ut et usui consulatur simul et humanitati, non est omnino rejicienda Anatomia Vivorum, neque ad fortuitas chirurgicorum inspectiones (quod Celsus fecit) remittenda; cum hoc ipsum bene expediri possit per dissectionem brutorum vivorum quæ, non obstante suarum partium dissimilitudine ab humanis, huic inquisitioni adhibito judicio satisfacere possint.[2]

Item in inquisitione illorum de Morbis, inveniunt morbos complures quos *insanabiles* decernunt, alios jam inde a principio morborum, alios post talem quampiam periodum. Ita ut L. Syllæ et Triumvirorum proscriptiones res nihili fuerint præ medicorum proscriptionibus, per quas tot homines iniquissimis edictis morti dedunt; quorum tamen plurimi minore cum difficultate evadunt, quam illi olim inter proscriptiones Romanas. Neque igitur dubitabo inter Desiderata reponere opus aliquod de Curationibus Morborum qui habentur pro Insanabilibus; ut evocentur et excitentur medici aliqui egregii et magnanimi, qui huic operi (quantum largitur natura rerum) incumbant; quando hoc ipsum, *istos morbos pronunciare insanabiles*, neglectum et incuriam veluti lege sanciat, et ignorantiam ab infamia eximat.

Item, ut paulo ulterius insistam; etiam plane censeo ad officium medici pertinere, non tantum ut sanitatem restituat, verum etiam ut dolores et cruciatus morborum mitiget; neque id ipsum solummodo cum illa mitigatio doloris, veluti symptomatis periculosi, ad convalescentiam faciat et conducat; imo vero cum, abjecta prorsus omni sanitatis spe, excessum tantum præbeat e vita magis lenem et placidum. Siquidem non parva est fœlicitatis pars (quam sibi tantopere

[1] This difficulty is almost entirely removed by the perfection to which the art of making anatomical preparations has been brought. Berengario of Carpi, who died at Ferrara in 1550, is said to have been the first person who made use of injections in order to render the vessels visible. He employed water (probably coloured) for this purpose. Swammerdam was the first to inject with wax. In one branch of anatomy, namely the doctrine of the development of the osseous parts, the use of madder in the food of the living animal has led to very curious results. It stains the portions of bone developed during its use of a bright red. Duhamel was the first to use this means of studying the growth of bone. Flourens has also employed it.

[2] Even this in the extent to which it has been carried appears to stand much in need of an apology; and it is satisfactory to find that one of our best anatomists seems o think so. I refer to Brodie's *Physiological Enquiries*.

precari solebat Augustus Cæsar) illa *Euthanasia*[1]; quæ etiam observata est in excessu Antonini Pii, quando non tam mori videretur quam dulci et alto sopore excipi. Scribitur etiam de Epicuro, quod hoc ipsum sibi procuraverit; cum enim morbus ejus haberetur pro desperato, ventriculum et sensus meri largiore haustu et ingurgitatione obruit; unde illud in epigrammate,

—— hinc Stygias ebrius hausit aquas.[2]

Vino scilicet Stygii laticis amaritudinem sustulit. At nostris temporibus medicis quasi religio est, ægrotis postquam deplorati sint assidere; ubi meo judicio, si officio suo atque adeo humanitati ipsi deesse nolint, et artem ediscere et diligentiam præstare deberent, qua animam agentes facilius et mitius e vita demigrent. Hanc autem partem, inquisitionem de Euthanasia Exteriori (ad differentiam ejus Euthanasiæ quæ animæ præparationem respicit) appellamus, eamque inter Desiderata reponimus.

Item in Curationibus Morborum illud generaliter *desiderari* reperio; quod medici hujusce ætatis, licet Generales Intentiones Curationum non male persequantur, Particulares tamen Medicinas quæ ad curationes morborum singulorum proprietate quadam spectant, aut non bene norunt aut non religiose observant. Nam medici traditionum et experientiæ probatæ fructum magistralitatibus suis destruxerunt et sustulerunt; addendo et demendo et mutando circa medicinas, prout iis libitum fuerit; et fere pharmacopœorum more *quid pro quo* substituendo; ita superbe imperantes medicinæ, ut medicina non amplius imperet morbo. Demptis enim Theriaca et Mithridatio et fortasse Diascordio et Confectione Alkermes[3] et paucis aliis medicinis, ad nulla fere certa pharmaca se religiose

[1] "Fere quoties audisset cito ac nullo cruciatu defunctum quempiam sibi et suis εὐθανασίαν similem (hoc enim et verbo uti solebat) precabatur." — *Suet. in Aug.* c. 99.

And so when life's sweet fable ends
His soul and body part like friends,
No quarrels, murmurs — no delay —
A kiss, a sigh, and then away.

CRASHAW: Lines prefixed to the English translation of *Cornaro*.

[2] See for this story Diog. Laert. x. 16.; the words quoted are the end of the modern Latin version of an epigram there given. The original contains nothing which corresponds to the word *ebrius*, which in the more recent editions of Diog. Laert. is replaced by *lætius*. Gassendi in his essay on Epicurus substitutes *protinus*.

[3] Theriaca, from which treacle is a corruption, is the name of a nostrum invented by Andromachus, who was physician to Nero. For an account of the history and composition

et severe astringunt. Nam medicamenta illa quæ in officinis prostant venalia, potius in promptu sunt ad intentiones generales, quam accommodata et propria ad curationes particulares; siquidem speciatim nullum morbum magnopere respiciunt; verum generatim ad obstructiones aperiendas, concoctiones confortandas, intemperies alterandas pertinent. Atque hinc præcipue fit, ut empirici et vetulæ sæpenumero in curandis morbis fœlicius operentur quam medici eruditi; quia medicinarum probatarum confectionem et compositionem fideliter et scrupulose retinent. Equidem memini medicum quendam apud nos in Anglia, practica celebrem, religione prope Judæum, librorum lectione tanquam Arabem, solitum dicere, *Medici vestri Europæi sunt quidem viri docti: sed non norunt particulares curationes morborum.* Quinetiam idem ludere solebat, parum decore, dicendo, *Medicos nostros similes esse Episcopis: ligandi et solvendi claves habere, et nihil amplius.* Sed ut serio quod res est dicamus; plurimum referre censemus, si medici aliqui, et eruditione et practica insigniores, opus aliquod conficiant de medicinis probatis et experimentalibus ad morbos particulares. Nam quod speciosa quis ratione nixus existimet decere medicum doctum (habita ratione complexionis ægrorum, ætatis, tempestatis anni, consuetudinum, et hujusmodi) potius medicinas ex tempore aptare, quam certis aliquibus præscriptis insistere; id fallax res est, et experientiæ non satis attribuit, judicio plus nimis. Sane quemadmodum in republica Romana cives erant utilissimi et optime compositi qui aut consules populo favebant, aut tribuni in partes senatus inclinabant; ita in hac materia de qua agimus medicos eos probamus qui aut in magna eruditione traditiones experientiæ plurimum faciunt, aut in practica insigni methodos et generalia artis non aspernantur. Modificationes vero medicinarum (si quando sit opus eas adhibere) potius in vehiculis earum exercendæ sunt, quam in ipso corpore medicinarum; in quo nil novandum, absque evidenti necessitate. Hanc igitur partem, quæ de Medicinis Authenticis et Positivis tractet, *desiderari* statuimus. Res autem est, quæ tentari non

of mithridaticum, see Celsus, v. 23. The invention of what was called diascordium is ascribed to Fracastorius, who speaks of it as "Diascordium nostrum" in his *De Cont. Morb. Cur.* iii. 7. The confection of Alkermes in its original form seems to have been invented by Mesné, an Arabian physician. About Bacon's time what was called mineral kermes, which was a preparation of antimony, was a popular medicine, but it s probable that he here refers either to the confection of Mesné or to some modification of it.

debet absque acri et severo judicio, et tanquam in synodo medicorum selectorum.

Item inter præparationes medicinarum, mirari subit (præsertim cum Medicinæ ex Mineralibus a Chymicis in tantum evectæ et celebratæ sint[1], cumque tales medicinæ tutius adhibeantur ad exteriora quam intro sumantur) neminem adhuc inventum, qui per artem Thermas Naturales et Fontes Medicinales imitari annixus fuerit; cum tamen in confesso sit thermas illas et fontes virtutes suas ex venis mineralium, per quas permeant, nancisci; quinetiam, in manifestum hujus rei documentum, bene norit humana industria discernere et distinguere per separationes quasdam ex quo genere mineralium hujusmodi aquæ inficiantur; veluti an ex sulphure, vitriolo, chalybe, aut aliquo simili? Quæ naturalis aquarum tinctura, si ad artificiosas compositiones reduci posset, fuerit in potestate hominis et plura genera earum prout usus postulat efficere, et temperamentum ipsarum pro arbitrio regere. Hanc igitur partem, de Imitatione Naturæ in Balneis Artificialibus (re proculdubio et utili et in promptu) *desiderari* censemus.

Ne vero singula scrupulosius exequamur quam vel instituto nostro vel hujusce tractatus naturæ convenit, claudemus hanc partem defectus alterius cujusdam enumeratione, qui maximi nobis videtur momenti; nimirum quod medendi ratio, quæ obtinuit, sit nimio plus compendiosa quam ut insigne aliquid aut arduum præstare possit. Etenim judicio nostro opinio fuerit magis blanda quam vera, si quis existimet medicamentum aliquod tam potens aut fœlix fieri posse, ut usus ejus simplex curationi alicui grandiori sufficiat. Mirabilis profecto foret oratio quæ pronunciata, aut etiam sæpius repetita, vitium aliquod animo penitus insitum aut inveteratum corrigere aut tollere possit. Longe certe abest. Verum quæ in natura eximie possunt et pollent, sunt ordo, prosecutio, series, vicissitudo artificiosa. Quæ, licet majus quoddam in præcipiendo judicium majoremque in parendo constantiam requirant, tamen effectuum magnitudine abunde rem compensant. Etsi autem ex opera medicorum quotidiana, quam invisendo, assidendo, præscribendo, ægrotis præstant, putaret quispiam haud segniter ipsos curationem persequi atque in eadem certa quadam via

[1] The school of medicine of which Paracelsus was the head distinguished itself from the Galenists, who had chiefly recourse to vegetable decoctions and infusions, by the use of mineral medicines. This school has been called that of the Iatro-chemists.

insistere; tamen si quis ea quæ præscribere et ministrare soleant medici acutius introspiciat, inveniet pleraque vacillationis et inconstantiæ plena, et quæ ex tempore excogitentur et in mentem illis veniant absque certo aliquo aut præviso curationis tramite. Debuerant autem etiam ab initio, post morbum bene perspectum et cognitum, seriem curandi ordinatam meditari; neque ab ea absque gravi causa discedere. Atque sciant pro certo medici, posse (exempli gratia) tria fortasse aut quatuor medicamenta ad morbum aliquem gravem curandum recte præscribi, quæ debito ordine et debito intervallo sumpta curationem præstent; quorum singula si per se tantum sumerentur, aut si ordo inverteretur, aut intervallum non servaretur, fuerint prorsus nocitura. Neque tamen id volumus, ut omnis scrupulosa et superstitiosa curandi ratio in pretio sit tanquam optima (non magis quam omnis *via arcta via* sit *ad cœlum*): verum ut æque recta sit via, ac arcta et difficilis. Hanc autem partem, quam Filum Medicinale vocabimus, *desiderari* ponimus. Atque hæc illa sunt, quæ in doctrina medicinæ de Curatione Morborum desideramus; nisi quod restet unicum, quod pluris est quam illa omnia. *Desideratur* nimirum Philosophia Naturalis Vera et Activa, cui Medicinæ scientia inædificetur. Cæterum illa non est hujusce tractatus.

Tertiam partem Medicinæ posuimus illam de *Prolongatione Vitæ*, quæ nova est, et *desideratur;* estque omnium nobilissima. Si enim tale aliquid inveniri possit, non versabitur tantum medicina in curationum sordibus, nec medici ipsi propter necessitatem solummodo honorabuntur; sed utique propter donum mortalibus ex terrenis quasi maximum, cujus poterint esse secundum Deum dispensatores et administri. Licet enim Mundus homini Christiano ad Terram Promissionis contendenti tanquam Eremus sit, tamen in Eremo ipso profiscentibus calceos et vestes (corpus scilicet nostrum, quod animæ loco tegminis est) minus atteri, Gratiæ Divinæ munus quoddam æstimandum. Hac de re, quia est ex optimis, eamque inter Desiderata posuimus, ex more nostro et Monita dabimus et Indicia et Præcepta.

Primo *monemus*, ex scriptoribus circa hoc argumentum neminem esse, qui aliquid magni, ne dicamus aliquid sani, repererit. Aristoteles certe commentarium de hoc edidit perpusillum, in quo nonnihil inest acuti; quod ipse omnia esse vult, ut solet.[1]

[1] Aristotle's tract *De Long. & Brev. Vitæ*, which, as Bacon remarks, is very brief

At recentiores tam oscitanter et superstitiose de hoc scripserunt, ut argumentum ipsum ob eorum vanitatem tanquam vanum et vecors haberi cœperit.

Secundo *monemus*, ipsas intentiones quæ huc spectant medicorum res nihili esse, et cogitationes hominum a re potius abducere quam versus eam dirigere. Sermocinantur enim, mortem in destitutione calidi et humidi consistere; debere itaque calorem naturalem confortari, humorem autem radicalem foveri. Perinde ac si hæc res jusculis, aut lactucis et malvis, aut amydo[1], aut jujubis, aut rursus aromatibus, aut vino generoso, aut etiam spiritu vini et oleis chymici confici possit; quæ omnia obsunt potius quam prosunt.

Tertio *monemus*, ut homines nugari desinant, nec tam faciles sint ut credant grande illud opus, quale est naturæ cursum remorari et retrovertere, posse haustu aliquo matutino aut usu alicujus pretiosæ medicinæ ad exitum perduci; non auro potabili, non margaritarum essentiis, et similibus nugis; sed ut pro certo habeant Prolongationem Vitæ esse rem operosam, et quæ ex compluribus remediis atque eorum inter se connexione idonea constet.[2] Neque enim quisquam ita stupidus esse debet, ut credat quod nunquam factum est adhuc, id fieri jam posse, nisi per modos etiam nunquam tentatos.

Quarto *monemus*, ut homines rite animadvertant et distinguant circa ea quæ ad vitam *sanam*, et ea quæ ad vitam *longam*, conferre possunt. Sunt enim nonnulla quæ ad spirituum alacritatem, et functionum robur, et morbos arcendos prosunt; quæ tamen de summa vitæ detrahunt, et atrophiam senilem absque morbis accelerant. Sunt et alia quæ ad prolongationem vitæ et atrophiam senilem longius summovendam juvant; sed tamen non usurpantur absque periculo valetudinis, adeo ut qui iis utentur ad prolongationem vitæ debeant simul incommodis occurrere, quæ alioquin ex eorum usu supervenire possint. Atque Monita hactenus dedimus.

relates to the length of life of all kinds of animals, and even of plants. Sanchez, a Spanish physician, who wrote a treatise on the same subject, thus remarks on Aristotle's: "Adeo longè breviterque disseruit Aristoteles, ut mirum sit tantum philosophum tam indignè rem hanc tractâsse." Not long before the publication of the *De Augmentis*, the *Methusala Vivax* of Dornavus was printed at Hanover; it contains an inquiry as to the causes of antediluvian longevity; Dornavus refutes the notion that the years in which the ages of the Patriarchs are stated are in reality only lunations, by referring to their ages when their first-born sons were begotten.

[1] This is manifestly a mistake for *amylo*. Amylum, or starch, is mentioned by Celsus as one of the "cibi lenes."

[2] The matter is much simplified by the Schola Salernitana:

"Cur moriatur homo cui salvia crescit in horto?" *Regimen Sanitatis*

Quod ad Indicia attinet; tale hujus rei (quam animo metimur) plasma est. Conservantur res et durant duobus modis; aut in Identitate sua, aut per Reparationem. In Identitate sua, ut musca aut formica in succino; flos aut pomum aut lignum in conservatoriis nivalibus; cadaver inter balsama. Per Reparationem, ut in flamma, et in mechanicis. Operanti ad Prolongationem Vitæ utroque genere utendum est (disjuncta minus possunt), corpusque humanum conservandum, quemadmodum Inanimata conservantur, ac rursus quemadmodum Flamma conservatur, ac denique quadantenus ut Mechanica conservantur. Tres igitur sunt ad prolongandam vitam intentiones; Retardatio Consumptionis, Probitas Reparationis, et Renovatio ejus quod cœpit veterascere. Consumptio fit a duabus Deprædationibus; deprædatione spiritus innati, et deprædatione aëris ambientis. Prohibitio utriusque duplex; aut si agentia illa fiant minus prædatoria, aut si patientia (succi scilicet corporis) reddantur minus deprædabilia. Spiritus fit minus prædatorius, si aut substantia densetur, ut in usu opiatorum et nitratorum, et in contristationibus; aut quantitate minuatur, ut in diætis Pythagoricis et Monasticis; aut motu leniatur, ut in otio et tranquillitate. Aër ambiens fit minus prædatorius, si aut minus incalescat a radiis solis, ut in regionibus frigidioribus, in speluncis, in montibus, et columnis anachoretarum; aut summoveatur a corpore, ut in cute densa, et in plumis avium, et in usu olei et unguentorum absque aromatibus. Succi corporis redduntur minus deprædabiles, si aut duri facti sint, aut roscidi sive oleosi. Duri, ut in victu aspero, vita in frigido, exercitationibus robustis, balneis quibusdam mineralibus. Roscidi, ut in usu dulcium, et abstinentia a salsis et acidis, et maxime omnium in tali mistione potus, quæ sit partium valde tenuium et subtilium, absque tamen omni acrimonia aut acedine. Reparatio fit per Alimenta. Alimentatio autem promovetur quatuor modis: per concoctionem viscerum ad extrusionem alimenti, ut in confortantibus viscera principalia; per excitationem partium exteriorum ad attractionem alimenti, ut exercitationibus et fricationibus debitis, atque unctionibus quibusdam et balneis appropriatis; per præparationem alimenti ipsius, ut facilius se insinuet et digestiones ipsas quadantenus anticipet, ut in variis et artificiosis modis cibi condiendi, potus miscendi, panis fermentandi, et horum trium virtutes in unum redigendi; per confortationem ipsius ultimi actus assimilationis, ut in somno

tempestivo, et applicationibus quibusdam exterioribus. Renovatio ejus quod cœpit veterascere fit duobus modis: vel per intenerationem habitus corporis ipsius, ut in usu malacissationum ex balneis, emplastris, et unctionibus, quæ talia sint ut imprimant, non extrahant; vel per expurgationem succi veteris, et substitutionem succi novi, ut in tempestivis et repetitis purgationibus, sanguinis missionibus, et diætis attenuantibus, quæ florem corporis restituunt. Atque de Indiciis hactenus.

Præcepta, quanquam ex ipsis Indiciis plurima possint deduci, tria tamen veluti præcipua subjungere visum est. *Præcipimus* primo, ut prolongatio vitæ expectetur potius a diætis statis quam a regimine aliquo victus familiari, aut etiam a medicamentorum particularium excellentia. Etenim quæ tanta virtute pollent ut naturam retrovertere valeant, fortiora plerumque sunt et potentiora ad alterandum quam ut simul in aliqua medicina componi, multo minus in victu familiari interspergi possint. Superest itaque ut seriatim, et regulariter, et ad tempora certa et vicibus certis recurrentia, adhibeantur.

Secundo *præcipimus*, ut prolongatio vitæ expectetur potius ab operatione in spiritus, et a malacissatione partium, quam a modis alimentandi. Etenim cum corpus humanum ejusque fabrica (missis externis) a tribus patiatur, spiritibus scilicet, partibus, et alimentis; via prolongationis vitæ per alimentandi modos longa est, atque per multas ambages et circuitus; at viæ per operationes super spiritus et super partes multo breviores sunt, et quibus citius ad finem desideratum pervenitur; eo quod spiritus subito patiantur et a vaporibus et ab affectibus, quæ miris modis in eos possunt; partes item per balnea aut unguenta aut emplastra, quæ subitas etiam impressiones faciunt.

Tertio *præcipimus*, quod malacissatio partium per exterius fieri debet per Consubstantialia, Imprimentia, et Occludentia. Consubstantialia enim benevolo partium amplexu libenter excipiuntur, et proprie malacissant. Imprimentia autem et virtutem malacissantium, tanquam vehicula, facilius et altius deducunt, atque ipsa partes nonnihil expandunt. Occludentia autem virtutem utrorumque retinent et paulisper figunt, et perspirationem, quæ est res malacissationi opposita (quia humidum emittit), cohibent. Itaque per hæc tria, (sed potius ordine disposita et succedentia, quam commixta,) res absolvitur. Interim in hac parte monemus, non eam esse intentionem malacissationis ut nutriat partes per exterius, sed tantum ut eas reddat

magis idoneas ad nutriendum. Quidquid enim magis aridum est, minus est activum ad assimilandum. Atque de Prolongatione Vitæ, quæ est pars tertia Medicinæ noviter ascripta, hæc dicta sint.[1]

Veniamus ad Cosmeticam, quæ certe partes habet civiles, partes rursus effœminatas. Corporis enim munditia et decor honestus recte existimatur promanare a modestia quadam morum, et a reverentia; inprimis erga Deum, cujus creaturæ sumus; tum erga societatem, in qua degimus; tum etiam erga nosmetipsos, quos non minus, imo magis, quam alios revereri debemus. Verum adulterina illa decoratio, quæ fucos et pigmenta adhibet, digna certe est illis defectibus qui eam semper comitantur; cum non sit aut ad fallendum satis ingeniosa, aut ad utendum satis commoda, aut ad salubritatem satis tuta et innocua. Miramur autem pravam hanc consuetudinem fucandi leges censorias, tam ecclesiasticas quam civiles, (quæ alias in luxuriam circa vestes aut cultus capillorum effœminatos admodum fuerint severæ) ita diu fugisse. Legimus certe de Jezabele, quod pigmentis faciem obliverit; verum de Esthera et Juditha nil tale perhibetur.

Pergamus ad Athleticam. Eam sensu intelligimus paulo largiori, quam accipi consuevit. Huc enim referimus, quidquid versatur circa conciliandam qualemcunque (quam corpus humanum suscipit) Habilitatem; sive sit Agilitatis, sive Tolerantiæ. Quarum Agilitas duas habet partes, Robur et Velocitatem; ac Tolerantia itidem duas, vel Indigentiarum Naturalium Patientiam, vel in Cruciatibus Fortitudinem. Quorum omnium videmus sæpenumero exempla insignia, in practica funambulorum; in duro victu hominum quorundam barbarorum; in stupendis viribus maniacorum; et in constantia nonnullorum inter exquisita tormenta. Imo si aliqua alia reperiatur facultas quæ in priorem partitionem non cadit (qualis in Urinatoribus sæpe conspicitur, qui mirifice anhelitum cohibere possunt), ad hanc ipsam artem aggregari volumus. Atque quod talia fieri quandoque possint, manifestissimum est; at philosophia et inquisitio causarum circa eadem fere neglecta jacet; hanc arbitramur ob causam, quod hominibus persuasum sit hujusmodi magisteria naturæ solummodo vel ex peculiari certorum hominum indole (quæ sub disciplinam non cadit), vel a diutina ab

[1] Compare Bacon's *Historia Vitæ et Mortis*, particularly for the view he takes of the depredations of the animal spirits.

annis usque puerilibus consuetudine (quæ potius imperari quam doceri solet), obtinere. Quod etsi verum prorsus non sit, tamen defectus hujusmodi rerum quid attinet notare? Certamina enim Olympica jam diu cessarunt; tum etiam in ejusmodi rebus mediocritas sufficit ad usum, excellentia autem mercenariæ cuidam ostentationi fere inservit.

Postremo accedimus ad Artes Voluptarias. Eæ secundum sensus ipsos dispertitæ sunt. Oculos oblectat præcipue Pictoria, cum aliis artibus innumeris (quæ ad magnificentiam spectant) circa ædificia, hortos, vestes vasa, calices, gemmas, et similia. Aures demulcet Musica, quæ tanta vocum, spiritus, chordarum, varietate et apparatu instructa est. Olim etiam Hydraulica pro Coryphæis quibusdam artis ejus habita sunt, quæ nunc prope obsoleverunt. Atque artes, quæ ad visum aut auditum spectant, præ aliis præcipue liberales habitæ sunt. Sensus hi duo magis casti; scientiæ magis eruditæ; quippe qui etiam Mathematicam veluti ancillam in familiis suis habeant. Etiam altera ad memoriam et demonstrationes, altera ad mores et affectus animi nonnihil respicit. Reliquorum sensuum oblectationes, atque artes circa ipsos, minus in honore sunt; veluti luxuriæ quam magnificentiæ propiores. Unguenta, odoramenta, deliciæ et cupediæ mensarum, maxime autem incitamenta libidinis, rectius censore quam doctore indigent. Optime sane a quibusdam annotatum est, nascentibus et crescentibus rebuspublicis artes militares florere, in statu et culmine positis liberales, at ad declinationem et decasum vergentibus voluptarias. Hæc vero ætas nostra, vereor ne tanquam in decasu fœlicitatis in artes voluptarias inclinet. Quare ista missa faciamus. Cum Artibus Voluptariis Joculares copulo. Deceptiones siquidem sensuum inter delectationes sensuum reponendæ sunt.

Jam vero, transcursis doctrinis illis circa Corpus Humanum (Medicina, Cosmetica, Athletica, Voluptaria), illud obiter monemus: cum in corpore humano tot res in considerationem veniant, Partes, Humores, Functiones, Facultates, Accidentia; cumque (si nobis integrum esset) constitui oportuisset corpus unicum doctrinæ de Corpore Humano, quæ ista omnia complecteretur (simile illi doctrinæ de Anima de qua mox dicemus), tamen ne artes nimis multiplicentur, neve veteres artium limites (plus quam necesse fuerit) transponantur; doctrinam de Partibus Corporis Humani, de Functionibus, de Humoribus, de Respiratione, de Somno, de Generatione, de Fœtu et Gesta-

tione in Utero, de Augmentis, de Pubertate, de Canitie, de Impinguatione, et similibus, in Corpus Medicinæ recipimus; licet ad officia illa tria non proprie pertineant; sed quia Corpus ipsum Hominis sit per omnia Medicinæ subjectum. Motum autem Voluntarium, et Sensum, ad doctrinam de Anima rejicimus; siquidem Animæ partes in his duobus sunt potiores. Atque sic doctrinam, quæ circa Corpus Hominis versatur, (quod Animæ pro tabernaculo duntaxat est,) claudimus.

CAPUT III.

Partitio Philosophiæ Humanæ circa Animam, in Doctrinam de Spiraculo *et Doctrinam de* Anima Sensibili *sive* Producta. *Partitio secunda ejusdem Philosophiæ in Doctrinam de* Substantia et Facultatibus Animæ *et Doctrinam de* Usu *et* Objectis Facultatum. *Appendices duæ Doctrinæ de Facultatibus Animæ; Doctrina de* Divinatione Naturali, *et Doctrina de* Fascinatione. *Distributio Facultatum Animæ Sensibilis, in* Motum *et* Sensum.

Veniamus ad doctrinam de Anima Humana; e cujus thesauris omnes cæteræ doctrinæ depromptæ sunt. Ejus duæ sunt partes; altera tractat de Anima Rationali, quæ divina est; altera de Irrationali, quæ communis est cum brutis. Notavimus autem paulo superius (ubi de Formis loquebamur) differentes illas duas Animarum emanationes, quæ in prima utriusque creatione se dant conspiciendas; nimirum, quod altera ortum habuerit a Spiraculo Dei, altera e Matricibus Elementorum. Nam de Animæ Rationalis generatione primitiva ita ait Scriptura, *Formavit hominem de limo terræ, et spiravit in faciem ejus spiraculum vitæ.* At generatio Animæ Irrationalis, sive Brutorum, facta est per verba illa, *Producat aqua; Producat terra*[1]; hæc autem Anima (qualis est in homine) Animæ Rationali

[1] To the same effect S. Thomas Aquinas says: "Anima brutorum producitur ex virtute aliquâ corporeâ, anima vero humana a Deo. Et ad hoc significandum dicitur Gen. i. quantum ad alia animalia Producat terra animam viventem; Quantum vero ad hominem dicitur quod inspiravit in faciem ejus spiraculum vitæ." — *Sum. Theol.* i. 75. 6.

But the doctrine that in man there is an irrational soul, as in brutes, to which the rational soul is a distinct addition, is not only not countenanced as M. Bouillet supposes by S. Augustine and the schoolmen (see his edition of Bacon's philosophical works, ii. p. 531.), but is distinctly condemned by them. Bacon derived it from Telesius. See General Preface, p. 50.

organum tantum est, atque originem habet et ipsa quoque, quemadmodum in brutis, e limo terræ. Neque enim dictum est, *Formavit corpus hominis de limo terræ*, sed *Formavit hominem;* integrum scilicet hominem, excepto illo spiraculo. Quamobrem partem primam doctrinæ generalis circa Animam Humanam, doctrinam de Spiraculo appellabimus; Secundam vero, doctrinam de Anima Sensibili sive Producta. Neque tamen, cum hactenus Philosophiam solam tractemus (quippe Sacram Theologiam in fine operis collocavimus) partitionem istam a Theologia mutuaremus, nisi etiam cum principiis Philosophiæ conveniret. Plurimæ enim et maximæ sunt Animæ Humanæ præcellentiæ supra animas brutorum, etiam philosophantibus secundum sensum manifestæ. Ubicunque autem tot et tantarum invenitur excellentiarum symbolum, ibi merito semper constitui debet differentia specifica. Itaque nobis non nimium placet confusa illa et promiscua philosophorum de Animæ Functionibus tractatio; ac si Anima Humana gradu potius quam specie discriminata esset ab anima brutorum; non aliter quam sol inter astra, aut aurum inter metalla.

Subjungenda est etiam partitio alia Doctrinæ Generalis circa Animam Humanam, antequam de speciebus fusius loquamur. Etenim quæ de speciebus postea dicemus utramque partitionem, tum illam quam jam modo posuimus, tum istam quam nunc proponemus, simul tractabunt. Secunda igitur partitio sit, in doctrinam de Substantia et Facultatibus Animæ, et doctrinam de Usu et Objectis Facultatum.

Præmissis itaque his partitionibus geminis, ad species accedamus. Doctrina de Spiraculo, eademque de Substantia Animæ Rationalis, complectitur inquisitiones illas de natura ejus; *utrum nativa sit illa, an adventitia; separabilis, an inseparabilis; mortalis, an immortalis; quatenus legibus materiæ alligata, quatenus minime;* et similia. Quæ vero hujus sunt generis, licet etiam in philosophia et diligentiorem et altiorem inquisitionem subire possint quam adhuc habetur, utcunque tamen in fine religioni determinanda et diffinienda rectius transmitti censemus. Aliter enim erroribus haud paucis et sensus illusionibus omnino exponentur. Etenim cum Substantia Animæ in creatione sua non fuerit extracta aut deducta ex massa cœli et terræ, sed immediate inspirata a Deo; cumque leges cœli et terræ sint propria subjecta philosophiæ; quomodo possit cognitio de Substantia Animæ Rationalis ex philosophia peti et

haberi? Quinimo ab eadem inspiratione divina hauriatur, a qua Substantia Animæ primo emanavit.[1]

Doctrina vero de Anima Sensibili sive Producta, etiam quatenus ad Substantiam ejus, vere inquiritur; at ea inquisitio nobis quasi *desiderari* videtur. Quid enim ad doctrinam de Substantia Animæ faciunt Actus Ultimus et Forma Corporis, et hujusmodi nugæ logicæ[2]? Anima siquidem Sensibilis sive Brutorum plane substantia corporea censenda est, a calore attenuata et facta invisibilis; aura (inquam) ex natura flammea et aërea conflata, aëris mollitie ad impressionem recipiendam, ignis vigore ad actionem vibrandam, dotata; partim ex oleosis, partim ex aqueis nutrita; corpore obducta, atque in animalibus perfectis in capite præcipue locata, in nervis percurrens, et sanguine spirituoso arteriarum refecta et reparata; quemadmodum Bernardinus Telesius, et discipulus ejus Augustinus Donius, aliqua ex parte non omnino inutiliter asseruerunt.[3] Itaque de hac doctrina diligentior fiat inquisitio; eo magis, quod hæc res non bene intellecta opiniones superstitiosas et plane contaminatas, et dignitatem Animæ Humanæ pessime conculcantes, de Metempsychosi et Lustrationibus Animarum per periodos annorum, denique de nimis propinqua Animæ Humanæ erga animas brutorum per omnia cognatione, peperit. Est autem hæc Anima in brutis

[1] The anima rationalis is immaterial, — the anima sensibilis is as much material as any other part of man's frame. To it however Telesius, whom Bacon here follows, ascribes sensation, imagination, &c., leaving the higher faculties, and especially the moral sense as the portion of the anima rationalis. Donius, to whom Bacon refers a little further on, in effect rejects the anima rationalis altogether; admitting, in apparently insincere deference to received opinions, that it may exist; but holding that, if it does so, it is incognisable by human reason.

[2] Bacon refers to the Aristotelian definition of the soul, "Actus primus corporis physici organici vitam potentiâ habentis," and to the doctrine immediately connected with this definition that the soul is the form of man. It is obvious that the actus primus may also be spoken of as actus ultimus, according to the direction in which the arrangement proceeds, but I do not know whether Bacon had any reason for deviating from the usual phraseology.

With respect to the phrase "forma corporis," it is to be remarked that the Scotists maintained the existence of a "forma corporis," that namely which gives the body corporeity distinct from the informing principle or soul of man; — a subtlety introduced to evade the difficulties which the gradual development of the body from its first rudiments to perfection, — that is, its gradual progress to corporeity, — appears to present when contrasted with the way in which the rational soul is infused. For it was a received opinion that the soul is not "ex traduce," that is, not derived from that of the progenitor, but on the contrary is infused as it were ab extra into the body it informs.

[3] See the fifth book of Telesius *De Rerum Natura*, and the second book, particularly the fourth and fifth chapters, of Donius *De Naturâ Hominis*; and compare Campanella *De Sensu Rerum*, ii. 4. Campanella follows Telesius more closely than Donius does.

anima principalis, cujus corpus brutorum organum; in homine autem, organum tantum et ipsa Animæ Rationalis; et Spiritus potius appellatione quam Animæ indigitari possit. Atque de Substantia Animæ hactenus.

Facultates autem Animæ notissimæ sunt; Intellectus, Ratio, Phantasia, Memoria, Appetitus, Voluntas, denique universæ illæ, circa quas versantur scientiæ Logicæ et Ethicæ. Sed in doctrina de Anima, Origines ipsarum tractari debent, idque physice, prout animæ innatæ sint et adhæreant; Usus tantum ipsarum, et Objecta, illis alteris artibus deputantur. Atque in hac parte nihil egregii (ut nobis videtur) adhuc repertum est; quanquam desiderari eam haud sane dixerimus. Habet etiam pars ista De Facultatibus Animæ, appendices duas; quæ et ipsæ, quemadmodum tractantur, potius fumos nobis exhibuerunt quam flammam aliquam lucidam veritatis. Altera harum est doctrina de Divinatione Naturali; altera de Fascinatione.

Divinationem ab antiquis, nec male, in duas partes divisam habemus; Artificialem, et Naturalem. Artificialis, ratiocinando, ex indicatione signorum, prædictionem colligit: Naturalis, ex ipsa animi præsensione interna, absque signorum adminiculis, præsagit. Artificialis duplex; altera argumentatur ex Causis, altera ex Experimentis tantum, cœca quadam authoritate. Quæ posterior, ut plurimum, superstitiosa est; quales erant ethnicorum disciplinæ circa Inspectionem Extorum, Volatum Avium, et similia. Etiam Chaldæorum Astrologia solennior, non multo melior. At Artificialis Divinatio utraque inter diversas scientias spargitur. Habet Astrologus prædictiones suas, ex situ astrorum. Habet etiam Medicus suas, de morte ingruente; de convalescentia; de symptomatibus morborum superventuris, ex urinis, pulsibus, aspectu ægrorum, et similibus. Habet et Politicus suas; *O urbem venalem, et cito perituram si emptorem invenerit*[1]; cujus vaticinii fides non diu morata est; impleta primum in Sylla, postea in Cæsare. Hujusmodi igitur prædictiones præsentis non sunt instituti, verum ad artes proprias remitti debent. Naturalis autem Divinatio, ex vi scilicet interna animi ortum habens, ea demum est de qua nunc agitur. Hæc duplex est; altera Nativa, altera per Influxum. Nativa hoc nititur suppositionis fundamento; quod anima in se reducta atque collecta, nec in corporis organa diffusa, habeat ex vi propria essentiæ suæ aliquam prænotionem

[1] Sallust, in Bell. Jugurth. 38.

rerum futurarum. Illa vero optime cernitur in somnis, ecstasibus, confiniis mortis; rarius inter vigilandum, aut cum corpus sanum sit ac validum.[1] Hujusmodi vero status animi procuratur fere aut adjuvatur ex abstinentiis, atque illis rebus quæ animam a muneribus corporis exercendis maxime sevocant, ut sua natura absque impeditionibus exteriorum gaudere possit. Divinatio vero per Influxum hoc altero suppositionis fundamento nititur; quod anima, veluti speculum, illuminationem quandam secundariam a præscientia Dei et spirituum excipiat; cui etiam idem, qui priori, status et regimen corporis confert. Eadem enim animæ sevocatio efficit, ut et sua natura impensius utatur, et divinorum influxuum sit magis susceptiva; nisi quod in Divinationibus per Influxum anima fervore quodam atque tanquam numinis præsentis impatientia (quæ apud priscos *Sacri Furoris* nomine vocabatur) corripiatur; in Divinatione autem Nativa, quieti potius et vacationi propior sit.

Fascinatio autem est vis et actus imaginationis intensivus in corpus alterius: (vim enim imaginationis super corpus proprium ipsius imaginantis superius perstrinximus.) In hoc genere schola Paracelsi, et ementitæ Naturalis Magiæ cultores, tam fuerunt immodici ut imaginationis impetum et apprehensionem Miracula-patranti Fidei tantum non exæquarint.[2] Alii ad similitudinem veri propius accedentes, cum occultas rerum energias et impressiones, sensuum irradiationes, contagionum de corpore in corpus transmissiones, virtutum magneticarum delationes, acutius intuerentur, in eam opinionem devenerunt, ut multo magis a spiritu in spiritum (cum spiritus præ rebus omnibus sit et ad agendum strenuus, et ad patiendum tener et mollis) impressiones et delationes et communicationes fieri poterint. Unde increbuerunt opiniones factæ quasi populares de Genio superiori, de hominibus quibusdam infaustis et ominosis, de ictibus amoris et invidiæ, et aliæ his similes.

[1] A curious illustration of this remark is mentioned in the geography ascribed to Ibn Haukal. When a prince among the Khazars was made Khakan, he was strangled with a piece of taffeta, and asked, when he could scarcely breathe, how long he had to reign. He answered so many years; and if he reached the term, was then put to death. This was also a Turkish usage, except that it does not seem that they put the prince to death if he lived as long as he had foretold. See Klaproth, *Tableaux Hist. de l'Asie*, p. 273.

On the subject of natural divination see Campanella, *De Sensu Rerum*, iii. 7—11. He says of himself: "Ast ego, cum mali quippiam mihi imminet, inter somnium et vigiliam audire soleo vocem clarè loquentem mihi 'Campanella, Campanella,' et interdum alia addentem, et ego attendo nec intelligo quis sit."

[2] See Paracelsus's tract *De Vi imaginativâ* and many other parts of his writings.

Atque huic conjuncta est disquisitio, *quomodo imaginatio intendi et fortificari possit?* Quippe si imaginatio fortis tantarum sit virium, operæ-pretium fuerit nosse quibus modis eam exaltari et seipsa majorem fieri detur? Atque hic oblique, nec minus periculose, se insinuat palliatio quædam et defensio maximæ partis Magiæ Cæremonialis. Speciosus enim fuerit prætextus, cæremonias, characteres, incantationes, gesticulationes, amuleta, et similia, non ex aliquo tacito aut sacramentali cum malis spiritibus contractu vires nancisci[1]; sed eo pertinere tantum, ut imaginatio illius qui his utitur roboretur et exaltetur; quemadmodum etiam in religione usus imaginum, ad mentes hominum in rerum contemplatione defigendas et devotionem precantium excitandam, invaluit. Attamen mea talis est sententia; etiamsi detur vim imaginationis esse utique potentem; atque insuper cæremonias vim illam intendere et roborare; posito denique quod adhibeantur cæremoniæ ad hanc intentionem sincere, atque tanquam remedium physicum, absque aliqua vel minima cogitatione de invitandis per ipsas auxiliis spirituum; haberi nihilominus debent pro illicitis, propterea quod sententiæ illi divinæ adversus hominem propter peccatum latæ repugnent et recalcitrent, *In sudore vultus comedes panem tuum.*[2] Siquidem Magia ejus generis egregios illos fructus quibus Deus pretium laborem constituit, adipiscendos proponit per paucas easque faciles et minime operosas observantias.

Supersunt doctrinæ duæ, quæ ad Facultates Animæ Inferioris sive Sensibilis præcipue spectant; utpote quæ cum organis corporeis maxime communicant; altera de Motu Voluntario, altera de Sensu et Sensibili. In priori harum, etiam alias satis jejune inquisita, unica pars fere integra *deest.* Etenim de officio et fabrica commoda nervorum et musculorum, et aliorum quæ ad hunc motum requiruntur; quæque pars corporis quiescat dum alia moveatur; tum quod hujusce motus rector et quasi auriga sit imaginatio, adeo ut dimissa imagine ad quam motus fertur statim intercipiatur et sistatur motus ipse (ut cum deambulamus, si alia subeat cogitatio acris et defixa, continuo consistimus); et aliæ nonnullæ subtilitates non malæ, in observationem et inquisitionem jampridem venerunt. Quomodo

[1] Paracelsus says that the devil's claiming credit for the efficacy of these devices is as absurd as if, while the sheep were inquiring to whom a lock of wool belonged, the wolf should come up and affirm that it was his.

[2] Gen. iii. 19.

vero compressiones et dilatationes et agitationes spiritus (quî proculdubio motus fons est) corpoream et crassam partium molem flectat, excitet, aut pellat, adhuc diligenter inquisitum et tractatum non est. Neque mirum, cum Anima ipsa Sensibilis hactenus potius pro entelechia et functione quadam habita sit, quam pro substantia.[1] At quando jam innotuerit ipsam esse substantiam corpoream et materiatam, necesse est etiam ut quibus nixibus aura tam pusilla et tenera corpora tam crassa et dura in *motu* ponere possit inquiratur. De hac parte igitur, cum *desideretur*, fiat inquisitio.

At de Sensu et Sensibili longe uberior et diligentior adhibita est inquisitio, tam in tractatibus circa ea generalibus quam in artibus specialibus, utpote Perspectiva, Musica; quam vere, nihil ad institutum; quandoquidem illa tanquam Desiderata ponere non liceat. Sunt tamen duæ partes nobiles et insignes, quas in hac doctrina *desiderari* statuimus; altera de Differentia Perceptionis et Sensus, altera de Forma Lucis.

Atque differentiam inter Perceptionem et Sensum bene enucleatam debuerant philosophi tractatibus suis de Sensu et Sensibili præmittere, ut rem maxime fundamentalem. Videmus enim quasi omnibus corporibus naturalibus inesse vim manifestam *percipiendi;* etiam electionem quandam amica amplectendi, inimica et aliena fugiendi. Neque nos de subtilioribus perceptionibus tantum loquimur; veluti cum magnes ferrum allicit; flamma ad naphtham assilit; bulla bullæ approximata coït; radiatio ab objecto albo dissilit; corpus animalis utilia assimilat, inutilia excernit; spongiæ pars (etiam super aquam elevata) aquam attrahit, aërem expellit; et hujusmodi. Etenim quid attinet talia enumerare? Nullum siquidem corpus ad aliud admotum illud immutat aut ab illo immutatur, nisi operationem præcedat Perceptio reciproca.

[1] In the school philosophy, at least among the Realists, every substantial form (and the soul among the rest) was regarded as a *substance*. This of course implies the possibility of its independent existence, though, as form and matter are correlatives, it is difficult to understand how either can exist apart from the other. This difficulty however seems to have been completely surmounted or set aside; and thus, for instance, St. Thomas Aquinas affirms that angels are immaterial forms (*Sum. Theol.* i. 61). Bacon's remark that the soul had hitherto been looked on rather as a function than a substance refers, I think, to Melancthon's exposition of the Aristotelian doctrine. For Melancthon, whose views of the Peripatetic philosophy had long great influence in the Protestant universities, affirms that, according to the true view of Aristotle's opinion, the soul is not a substance but an ἐντελέχεια or functio. The word ἐντελέχεια he conceives to be only a modification of ἐνδελέχεια, which he proposes to render "habitualis agitatio seu δύναμις quædam ciens actiones." See his *De Animâ*, c. 15.

Percipit corpus meatus quibus se insinuat; *percipit* impetum alterius corporis cui cedit; *percipit* amotionem alterius corporis a quo detinebatur, cum se recipit; *percipit* divulsionem sui continui, cui ad tempus resistit; ubique denique est Perceptio. Aër vero Calidum et Frigidum tam acute *percipit*, ut ejus Perceptio sit longe subtilior quam tactus humani; qui tamen pro calidi et frigidi norma habetur. Duplex igitur deprehenditur circa hanc doctrinam hominum culpa; alia, quod eam intactam et intractatam (cum tamen sit res nobilissima) plerumque reliquerunt; alia, quod qui huic contemplationi forte animum adjecerunt longius quam par est provecti sunt, et *Sensum* corporibus omnibus tribuerunt; ut piaculum fere sit ramum arboris avellere, ne forte instar Polydori ingemiscat. At debuerant illi Differentiam Perceptionis et Sensus, non tantum in comparatione sensibilium ad insensibilia, secundum corpus integrum, explorare, (veluti plantarum et animalium); verum etiam in corpore ipso sensibili animadvertere, quid in causa sit cur tot actiones expediantur absque omni tamen Sensu; cur alimenta digerantur, egerantur; humores et succi sursum deorsum ferantur; cor et pulsus vibrent; viscera sua quæque opificia, sicut officinæ, producant; et tamen hæc omnia, et complura alia, absque Sensu fiant? Verum homines non satis acute, qualis sit actio Sensus, viderunt; atque quod genus corporis, quæ mora, quæ conduplicatio impressionis ad hoc requirantur, ut dolor vel voluptas sequatur? Denique differentiam inter Perceptionem simplicem et Sensum nullo modo nosse videntur; nec quatenus fieri possit Perceptio absque Sensu. Neque enim hæc verborum tantum controversia est, sed de re magni prorsus momenti. De hac igitur doctrina (ut inprimis utili, et ad plurima spectante) melius inquiratur. Quandoquidem etiam circa hanc rem inscitia tantum apud nonnullos ex antiquis philosophis potuerit, ut omnibus sine discrimine corporibus animam infundi putaverint; neque enim videbant quomodo Motus cum discretione fieri potuerit absque Sensu, aut Sensus adesse absque Anima.[1]

[1] There is a remarkable similarity between the view which Bacon here maintains and that which we find in several passages in the writings of Leibnitz. See his *Monadologie*, §§ 14. and 19., or his *Principes de la Nature et de la Grace*, § 4. The distinction between perceptio and sensus corresponds in Leibnitz's language to that between perception and apperception, a distinction on which the classification of the different orders of monads essentially depends. It is not probable that Bacon was acquainted with the most celebrated treatise on the doctrine of universally diffused sensation, namely

De Forma Lucis quod debita non facta fuerit inquisitio (præsertim cum in Perspectiva strenue elaborarint homines), stupenda quædam negligentia censeri possit. Etenim nec in Perspectiva nec alias aliquid de Luce quod valeat inquisitum est. Radiationes ejus tractantur, origines minime. Sed collocatio demum Perspectivæ inter Mathematica hunc ipsum defectum, et alios similes, peperit; quia a Physicis præmature discessum est. Tractatio autem de Luce et causis ejus in Physicis rursus superstitiosa fere est, tanquam de re inter divina et naturalia media; adeo ut quidam ex Platonicis eam Materia ipsa antiquiorem introduxerint: cum enim spatium esset diffla-tum, id primum lumine, postea vero corpore impletum fuisse, vanissimo commento asseruerunt; quando tamen Scripturæ Sacræ massam cœli et terræ tenebrosam, ante lucem creatam, diserte posuerint.[1] Quæ vero physice et secundum sensum de ea tractantur, ea statim ad radiationes descendunt, ut parum physicæ inquisitionis circa hanc rem extet. Debuerant autem homines contemplationes suas submittere paulisper, et quid sit Corporibus omnibus Lucidis commune inquirere, tanquam de Forma Lucis. Etenim quam immensa est corporis differentia (si ex dignitate considerentur) inter solem et lignum putridum, aut squamas etiam piscium putridas? Inquirere etiam debuerant, quid tandem in causa sit cur aliqua ignescant, et Lucem ex se jaciant calefacta, alia minime? Ferrum, metalla, lapides, vitrum, ligna, oleum, sevum, ab igne, vel flammam vibrant vel saltem rubescunt; at aqua, aër, acerrimo et tanquam furenti calore fervefacta, nihil tamen Lucis adipiscuntur, nec splendent. Quod si quis hoc eo fieri putet quod proprium sit ignis *lucere*, aqua autem et aër igni omnino inimica sint; is sane nunquam per obscura noctis in aqua salsa, tempestate calida, remigavit; cum guttulas aquæ, ex remorum concussione subsilientes, micare et lucescere videre potuisset. Quod etiam fit in

the *De Sensu Rerum* of Campanella, as it was not published much before the appearance of the *De Augmentis*; but the same doctrine had, as Brucker remarks, been taught, though not in so formal a manner, by Telesius, with whose works Bacon was as we know familiar; and it may in truth be traced in the writings of Giordano Bruno, of Cæsalpinus, and of Gilbert, and probably in those of many of their contemporaries. See for Leibnitz's remarks as to the origin of this doctrine, his letter to Thomasius, referred to in the note at p. 46.

[1] Bacon appears to refer to the visionary opinions of Fludd. See the first part of Fludd's great work referred to in the note at p. 526. The process of creation is illustrated by some curious engravings. There is an account of Fludd's views on this and other subjects in Tennemann's *History of Philosophy*, ix. p. 218.

spuma maris ferventiore, quam Pulmonem Marinum[1] vocant. Quid denique habent commune cum flamma et ignitis cicendulæ et luciolæ; et musca Indica, quæ cameram totam illustrat; et oculi quorundam animalium in tenebris; et saccharum inter radendum aut frangendum; et sudor equi nocte æstuosa festinantis; et alia nonnulla? Quin et homines tam parum in hac re viderunt, ut plerique scintillas e silice, aërem attritum putent. Attamen quando aër calore non ignescat, et Lucem manifesto concipiat, quomodo tandem fit ut noctuæ et feles et alia nonnulla animalia noctu cernant? Adeo ut ipsi aëri (quando visio absque Luce non transigatur) necesse est inesse Lucem aliquam nativam et genuinam, quamvis tenuem admodum et infirmam, quæ tamen sit radiis visivis hujusmodi animalium proportionata, iisque ad videndum sufficiat.[2] Verum hujusce mali (ut plurimorum) causa est, quod homines ex instantiis particularibus Formas naturarum Communes non elicuerunt; id quod nos tanquam subjectum proprium Metaphysicæ posuimus, quæ et ipsa Physicæ sive doctrinæ de Natura pars est. Itaque de Forma et Originibus Lucis fiat inquisitio, eaque interim inter Desiderata ponatur. Atque de doctrina circa Substantiam Animæ tam Rationalis quam Sensibilis, cum Facultatibus suis; atque de ejusdem doctrinæ Appendicibus, hæc dicta sint.

[1] See *Novum Organum*, ii. 12. p. 242., where Bacon speaks of the same phenomenon.

[2] That there is always some light in the air is a doctrine of Telesius's. See note 1.

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AD REGEM SUUM.

CAPUT I.

Partitio Doctrinæ circa Usum et Objecta Facultatum Animæ Humanæ in Logicam, *et* Ethicam. *Partitio Logicæ in Artes* Inveniendi, Judicandi, Retinendi, *et* Tradendi.

Doctrina circa Intellectum (Rex optime) atque illa altera circa Voluntatem Hominis, in natalibus suis tanquam gemellæ sunt. Etenim Illuminationis Puritas et Arbitrii Libertas simul incœperunt, simul corruerunt.[1] Neque datur in universitate rerum tam intima sympathia, quam illa Veri et Boni. Quo magis rubori fuerit viris doctis, si scientia sint tanquam angeli alati, cupiditatibus vero tanquam serpentes, qui humi reptant; circumgerentes animas instar speculi sane, sed menstruati.[2]

Venimus jam ad doctrinam circa Usum et Objecta Facultatum Animæ Humanæ. Illa duas habet partes, easque notissimas et consensu receptas; Logicam et Ethicam: nisi quod Doctrinam Civilem, quæ vulgo ut pars Ethicæ collocatur, jam ante emancipaverimus, et in integram doctrinam de Homine Congregato sive in Societate constituerimus; hic tantum de

[1] Namely at the fall; as St. Thomas Aquinas observes: "Homo peccando liberum arbitrium dicitur perdidisse, non quantum ad libertatem naturalem quæ est a coactione, sed quantum ad libertatem quæ est a culpâ et miseriâ." — *Sum. Theol.* i. 83. 2.

[2] For an account of the notion on which this use of the word menstruatus is founded, see Aristotle *De Insomniis*, 2. 8., or Pliny [vii. 13.]

Homine Segregato tractantes. Logica de Intellectu et Ratione; Ethica de Voluntate, Appetitu, et Affectibus disserit: altera Decreta, altera Actiones progignit. Verum quidem est, quod Phantasia in utraque provincia, tam judiciali quam ministeriali, legati cujusdam aut internuncii aut procuratoris reciproci vices gerit. Nam Sensus idola omnigena Phantasiæ tradit, de quibus postea Ratio judicat: at Ratio vicissim idola electa et probata Phantasiæ transmittit, priusquam fiat executio decreti. Siquidem motum voluntarium perpetuo præcedit eumque incitat phantasia; adeo ut phantasia sit utrique, tam rationi quam voluntati, instrumentum commune; nisi quod Janus iste bifrons sit et duas obvertat facies. Facies enim rationem aspiciens, veritatis habet effigiem; facies autem actionem aspiciens, effigiem bonitatis; quæ tamen sint facies,

——— quales decet esse sororum.[1]

Neque vero merus et nudus internuncius est phantasia; sed authoritatem non exiguam vel accipit vel usurpat, præter delationem simplicem mandati. Recte enim Aristoteles; *Id imperii habet anima in corpus, quod dominus in mancipium: ratio vero in phantasiam, quod in libera civitate magistratus in civem*[2], ad quem possit sua vice redire dominatio. Videmus enim quod in iis quæ sunt fidei et religionis, phantasia supra ipsam rationem scandat et evehatur; non quod illuminatio divina locum habeat in phantasia, (quin potius in ipsa arce mentis et intellectus); verum quemadmodum gratia divina in virtutibus utitur motibus voluntatis, ita similiter gratia divina in illuminationibus utitur motibus phantasiæ; unde fit ut religio semper aditum sibi ac viam ad animum quæsierit per Similitudines, Typos, Parabolas, Visiones, Insomnia. Rursus haud humile est regnum phantasiæ in persuasionibus, a vi eloquentiæ insinuatis. Nam ubi per orationis artificia hominum animi demulcentur, inflammantur, et in quamcunque partem pertrahuntur, totum illud fit per exuscitationem phantasiæ, quæ impotens jam facta non solum rationi insultat, verum eidem vim quodammodo facit, partim occœcando partim extimulando. Neque tamen causa videtur, cur a partitione priore discedamus. Nam phantasia

[1] Metamorph. ii. 14.

[2] ἡ μὲν γὰρ ψυχὴ τοῦ σώματος ἄρχει δεσποτικὴν ἀρχήν, ὁ δὲ νοῦς τῆς ὀρέξεως πολιτικὴν καὶ βασιλικήν. — *Arist. Pol.* i. 3.

ὄρεξις ought rather to have been rendered by *appetitus* than by *phantasia*; but the whole quotation was probably made from memory.

scientias fere non parit; siquidem poësis (quæ principio phantasiæ attributa est) pro lusu potius ingenii quam pro scientia habenda. Potestatem autem phantasiæ in naturalibus, doctrinæ de Anima paulo ante assignavimus. Eam vero quam habet cum rhetorica cognationem illi ipsi arti (de qua infra tractabimus) remitti par est.

Pars ista Humanæ Philosophiæ quæ ad Logicam spectat, ingeniorum plurimorum gustui ac palato minus grata est; et nihil aliud videtur quam spinosæ subtilitatis laqueus ac tendicula. Nam sicut vere dicitur, *Scientiam esse animi pabulum*[1]; ita in hoc pabulo appetendo et deligendo plerique palatum nacti sunt Israëlitarum simile in deserto; quos cupido incessit redeundi ad *ollas carnium, mannæ* autem fastidium cepit; quæ licet cibus fuerit cœlestis, minus tamen sentiebatur almus et sapidus. Eodem modo (ut plurimum) illæ Scientiæ placent, quæ habent infusionem nonnullam carnium magis esculentam[2]; quales sunt Historia Civilis, Mores, Prudentia Politica, circa quas hominum cupiditates, laudes, fortunæ, vertuntur et occupatæ sunt. At istud *lumen siccum* plurimorum mollia et madida ingenia offendit et torret. Cæterum unamquamque rem propria si placet dignitate metiri, Rationales Scientiæ reliquarum omnino claves sunt. Atque quemadmodum *manus instrumentum instrumentorum, anima forma formarum*[3], ita et illæ *artes artium* ponendæ sunt. Neque solum dirigunt, sed et roborant; sicut sagittandi usus et habitus non tantum facit ut melius quis collimet, sed ut arcum tendat fortiorem.

Artes Logicæ quatuor numero sunt; divisæ ex finibus suis in quos tendunt. Id enim agit homo in Rationalibus, aut ut *inveniat quod quæsiverit;* aut *judicet quod invenerit;* aut *retineat quod judicaverit;* aut *tradat quod retinuerit.* Necesse igitur est, ut totidem sint Artes Rationales; Ars Inquisitionis seu Inventionis; Ars Examinis seu Judicii; Ars Custodiæ seu Memoriæ; et Ars Elocutionis seu Traditionis.[4] De quibus jam sigillatim dicemus.

[1] Mr. Markby, in his edition of the *Advancement of Learning*, refers to Cicero, *Acad. Qu.* ii. 41.: "Est enim animorum ingeniorumque naturale quoddam quasi pabulum consideratio contemplatioque naturæ."— *J. S.*

[2] [So in the original.] Esculentarum?

[3] That the hand is the instrument of instruments, and the soul the form of forms, is said by Aristotle. See the *De Animâ*, iii. 8.

[4] These divisions are adopted from Peter Ramus; the artes logicæ including what Ramus calls Dialectic and Rhetoric, of which the former is divided into Inventio and Judicium, and the latter into Elocutio and Pronunciatio.

CAPUT II.

Partitio Inventivæ in Inventivam Artium, *et* Argumentorum: *quodque prior harum* (*quæ eminet*) desideretur. *Partitio Inventivæ Artium in* Experientiam Literatam, *et* Organum Novum. *Delineatio* Experientiæ Literatæ.

INVENTIONIS duæ sunt species, valde profecto inter se discrepantes; una Artium et Scientiarum, altera Argumentorum et Sermonum. Priorem harum *desiderari* prorsus pronuncio. Qui quidem talis mihi videtur esse defectus, ac si quis in inventario conficiendo bonorum alicujus defuncti ita referat, *Numeratæ pecuniæ nihil.* Ut enim cætera omnia pecunia parantur, ita et per hanc artem reliquæ acquiruntur. Atque sicut India Occidentalis nunquam nobis inventa fuisset nisi præcessisset acus nauticæ inventio, licet regiones illæ immensæ, versoriæ motus pusillus sit; ita non est cur miretur quispiam in Artibus perlustrandis et promovendis ampliores progressus factos non esse, quandoquidem Ars ipsa Inveniendi et Perlustrandi Scientias hactenus ignoretur.

Hanc Scientiæ *desiderari* partem plane in confesso est. Primo enim Dialectica nihil profitetur, imo ne cogitat quidem, de Inveniendis Artibus, sive Mechanicis sive (quas vocant) Liberalibus; aut etiam de illarum Operibus, harum vero Axiomatibus eliciendis; sed quasi præteriens homines alloquitur et dimittit, edicens ut *cuique in sua arte credant.*[1] Celsus, vir prudens, non solum medicus, (licet moris sit omnibus in laudes artis propriæ effundi) graviter et ingenue de empiricis et dogmaticis medicorum sectis loquens, fatetur, *Medicamenta et remedia prius fuisse inventa, de causis vero et rationibus posterius disceptatum: non ordine converso, causas ex natura rerum primo erutas fuisse, easque inventioni remediorum præluxisse.*[2] At Plato non semel innuit, *Particularia infinita esse; maxime rursus generalia minus certa documenta exhibere; medullam igitur scientiarum, qua artifex ab imperito distinguitur, in mediis propositionibus consistere, quas per singulas scientias tradidit et docuit experientia.*[3] Quin

[1] See Arist. Prior. Analyt. i. 30.

[2] See *Nov. Org.* i. 73. This is not what Celsus himself confesses, in the passage to which Bacon apparently refers; but what he represents the Empirics as urging against the Rationalists. — *J. S.*

[3] Bacon appears to refer principally to the passage in the *Philebus*, p. 17., which has already been mentioned. See note at p. 565. In the corresponding passage in the

et illi qui de primis rerum inventoribus aut scientiarum originibus verba fecerunt, casum potius quam artem celebrarunt; atque animalia bruta, quadrupedes, aves, pisces, serpentes, magis quam homines, tanquam Scientiarum doctores introduxerunt:

> Dictamnum Genitrix Dictæa carpit ab Ida
> Puberibus caulem foliis, et flore comantem
> Purpureo: non illa feris incognita capris
> Gramina, cum tergo volucres hæsere sagittæ.[1]

Adeo ut minime mirum sit (cum in more apud antiquos fuerit rerum utilium inventores consecrare) apud Ægyptios, gentem priscam (cui plurimæ Artes initia sua debent), templa plena fuisse simulachris brutorum, hominum vero simulachris prope vacua;

> Omnigenumque Deum monstra, et latrator Anubis,
> Contra Neptunum, et Venerem, contraque Minervam, &c.[2]

Quod si malis, ex traditione Græcorum, Artes potius hominibus ut inventoribus tribuere; haudquaquam tamen dixeris Prometheum ad ignis inventionem contemplationes adhibuisse; aut cum silicem primo percuteret scintillas expectasse; sed casu in illud incidisse, atque (ut aiunt) *furtum Jovi fecisse.* Ita ut ad artium inventionem quod attinet, capræ silvestri pro emplastris, Philomelæ pro modulationibus musicis, Ibidi pro lavationibus intestinorum[3], operculo ollæ quod dissiliit pro re tormentaria, denique (ut verbo dicamus) casui aut cuivis alteri rei plus debeamus, quam dialecticæ. Nec vero multo aliter se habet modus ille inveniendi, quem recte describit Virgilius,

> Ut varias usus meditando extunderet artes
> Paulatim.[4]

Non enim alia hic proponitur inveniendi methodus quam cujus bruta ipsa sunt capacia, et quam crebro usurpant; nimirum

Advancement of Learning, he refers to the *Theætetus*, which is certainly a mistake, as no such remark is to be found there. The nearest approach to it is, I think, τὰ μὲν στοιχεῖα ἄλογα καὶ ἄγνωστα εἶναι, αἰσθητὰ δέ, &c., the relation of letters to syllables and words being here as elsewhere typical of the nature of knowledge.

[1] Virg. Æn. xii. 412. [2] Virg. Æn. viii. 698.

[3] See Plutarch, *De Solertiâ Animalium*, or *De Iside*. Compare Pliny. The story of the accidental invention of gunpowder by Schwartz is well known. So too is it said that the Jesuit's bark was discovered by the lions who cured their fevers by drinking the water into which it had fallen. It is obvious that all stories of this kind are more or less mythical. The subject has been systematically discussed by Virey. (*Journal de Pharmacie*, 1818.)

[4] Virg. Georg. i. 133.

attentissima circa unam rem sollicitudo, ejusque perpetua exercitatio, quas sui conservandi necessitas hujusmodi animantibus imponit. Cicero enim vere admodum; *Usus uni rei deditus, et naturam et artem sæpe vincit.*[1] Quare si prædicetur de hominibus,

—— Labor omnia vincit
Improbus, et duris urgens in rebus egestas;[2]

etiam de brutis similiter quæritur,

Quis expedivit psittaco suum Χαῖρε?[3]

Corvo quis auctor fuit, ut magna siccitate lapillos immitteret arbori cavæ, ubi aquam forte conspexerit, ut surgentem laticem rostro posset attingere? Quis viam monstravit apibus, qui[4] per aërem, tanquam vastum mare, agros floridos, licet multum ab alvearibus dissitos, solent petere, et favos suos denuo repetere?[5] Quis formicam docuit, ut grana in colliculo suo reponenda circumroderet prius, ne reposita germinarent et spem suam illuderent?[6] Quod si in versu illo Virgiliano quis notet verbum illud *Extundere*, quod difficultatem rei, et verbum illud *Paulatim*, quod tarditatem innuit, redibimus unde profecti sumus, ad Ægyptiorum illos Deos; cum hactenus homines modice rationis facultate, neutiquam vero officio artis, usi sint ad inventa detegenda.

Secundo, hoc ipsum quod asserimus (si advertatur paulo

[1] "Assiduus usus uni rei deditus et ingenium et artem sæpe vincit." — *Cicero, Pro Balbo*, c. 20.

[2] Virg. Georg. i. 145.

[3] Persius, Prolog.

[4] *Qui*, as M. Bouillet remarks, is clearly a mistake for *quæ*.

[5] Much more remarkable than the return of the bees to their hive is the appearance of mathematical knowledge shown in the construction of their cells. In every case of instinct, the impulse in obedience to which the instinctive act is performed is a matter at the nature of which we can only guess; but the case just mentioned has a difficulty of its own. The bees may be supposed to know when they have reached their hive; but how do they perceive that the cell has acquired its just proportions? Several attempts have been made to explain away this especial difficulty; but those which I am acquainted with appear to be quite unsatisfactory. It is worthy of remark that the degree of accuracy with which the cells are constructed has been exaggerated; one writer after another having repeated, on the supposed authority of Maraldi, what Maraldi never said. According to his observations the angles of the terminal rhomb are about 108° and 72°. He does not attempt to determine them more precisely, although he has generally been supposed to do so. It has been recently stated that the mathematical problem which the cells of bees suggest was first correctly solved by Lord Brougham in the notes to his edition of Paley's *Natural Theology*; but this statement is, it need scarcely be said, erroneous.

[6] This statement is probably taken from Plutarch, *De Solertiâ Animalium*. The supposed grains of corn are no doubt the nymphæ. Huber repeatedly observed ants in the act of tearing the integument in which the young ant was enclosed, in order to facilitate its exit. This practice is, it may be presumed, the origin of the notion mentioned in the text.

diligentius) demonstrat Inductionis forma, quam proponit Dialectica; qua scilicet scientiarum principia inveniantur et probentur; quæ vitiosa plane est et incompetens, et naturam tantum abest ut perficiat, ut etiam eam pervertat et detorqueat. Qui enim modum acute introspexerit quo ros iste æthereus scientiarum, similis illi de quo loquitur poëta,

—— aërei mellis cœlestia dona,[1]

colligatur, (cum et scientiæ ipsæ ex exemplis singulis, partim naturalibus partim artificialibus, tanquam prati floribus et horti, extrahantur,) reperiet profecto animum suapte sponte et nativa indole Inductionem solertius conficere, quam quæ describitur a dialecticis; siquidem ex nuda enumeratione particularium (ut dialectici solent) ubi non invenitur instantia contradictoria, vitiose concluditur; neque aliquid aliud hujusmodi Inductio producit quam conjecturam probabilem. Quis enim in se recipiet, cum particularia quæ quis novit aut quorum meminit ex una tantum parte compareant, non delitescere aliquod quod omnino repugnet? Perinde ac si Samuel acquievisset in illis Isaï filiis quos coram adductos videbat in domo, et minime quæsivisset Davidem, qui in agro aberat.[2] Atque hæc Inductionis forma (si verum omnino dicendum sit) tam pinguis est et crassa, ut incredibile videatur tam acuta et subtilia ingenia (qualia in his rebus meditationes suas exercuerunt) potuisse eam mundo obtrudere, nisi illud in causa fuisset, quod opera festinata ad theorias et dogmata contendissent, particularia autem (præsertim moram in iis longiorem) ex fastu quodam et elatione animi despexissent. Illi enim exempla, sive instantias particulares, vice lictorum aut viatorum adhibuerunt ad summovendam turbam, ut dogmatibus suis viam aperirent; neutiquam autem ea inde ab initio in consilium advocarunt, ut legitima fieret et matura de rerum veritate deliberatio. Certe perculserit animos pia et religiosa quædam admiratio, cum videamus eadem calcata vestigia, ad errorem ducentia, in divinis et humanis. Quemadmodum enim in Divina Veritate percipienda ægre quis in animum inducat ut fiat tanquam parvulus;

[1] Virg. Georg. iv. 1.

[2] 1 Sam. xvi. We see from this very strong condemnation of the ordinary mode of induction, how much Bacon must have conceived his own method to differ from it. It is in fact impossible to apprehend Bacon's idea of his own process of induction, if we assume that it was to differ from that in common use only by being more systematic and more accurate. See the General Preface, p. 22.

ita in humana perdiscenda, provectos utique, puerorum more, prima Inductionum elementa adhuc legere et retractare, res humilis existimatur et quasi contemnenda.

Tertio, si concedatur principia scientiarum ex Inductione qua utuntur, vel sensu et experientia, recte posse constitui, certissimum est tamen axiomata inferiora ab iis per syllogismum non posse (in rebus naturalibus, quæ participant ex materia) recte et tuto deduci. In Syllogismo enim fit reductio propositionum ad principia per propositiones medias. Hæc autem sive Inveniendi sive Probandi forma, in Scientiis Popularibus (veluti Ethicis, Politicis, Legibus, et hujusmodi) locum habet; imo et in Theologicis; quandoquidem Deo pro bonitate sua placuerit captui humano se accommodare; at in Physicis, ubi Natura opere, non adversarius argumento constringendus est, elabitur plane veritas ex manibus, propter longe majorem naturalium operationum quam verborum subtilitatem; adeo ut succumbente Syllogismo, Inductionis (veræ scilicet et emendatæ) officio ubique opus sit, tam ad principia magis generalia quam ad propositiones inferiores. Nam syllogismi ex propositionibus consistunt; propositiones ex verbis; verba notionum tesseræ sunt; quare si notiones ipsæ (quæ verborum animæ sunt) male et varie a rebus abstrahantur, tota fabrica corruit.[1] Neque laboriosa vel consequentiarum argumentorum vel veritatis propositionum examinatio rem in integrum unquam restituet; cum error sit (ut loquuntur medici) in *digestione prima;* quæ a functionibus sequentibus non rectificatur. Non igitur absque magna et evidenti causa evenit, ut complures ex philosophis (aliqui autem eorum maxime insignes) Academici fuerint et Sceptici, qui scientiæ humanæ et syllepsium certitudinem sustulerunt; ultra verisimilitudinem aut probabilitatem negantes eam pertingere. Inficias non iverim, visum esse nonnullis Socratem, cum scientiæ certitudinem a se amoveret, per ironiam tantum hoc fecisse[2], et *scientiam dissimulando simulasse;* renunciando scilicet iis quæ manifesto sciebat, ut eo modo etiam quæ nesciebat scire

[1] Compare *Novum Organum*, i. 13. and 14. The formation of abstract conceptions is one of the objects of Bacon's inductive method, as well as the establishment of axioms. See Gen. Pref. p. 37. It is difficult to understand how the subtlety of language and the subtlety of natural operations can be compared. Bacon must be understood to mean that scientific terms and the conceptions which they express are not an adequate representation of the natural phenomena which have led to their formation.

[2] "Socrates autem, de se ipso detrahens in disputatione, plus tribuebat iis quos volebat refellere. Ita cum aliud diceret atque sentiret, libenter uti solitus est ea dissimulatione quam Græci εἰρωνείαν vocant." *Cic. Ac. Qu.* ii. 5. 15.—*J. S.*

putaretur. Neque etiam in recentiore Academia (quam amplexus est Cicero) illa opinio Acatalepsiæ admodum sincere culta fuit. Etenim qui eloquentia floruerunt hanc fere sectam sibi desumpserunt, ut in utramque partem copiose disserendi gloriam assequerentur; unde a via illa recta, per quam ad veritatem pergere debuissent, tanquam ad deambulationes quasdam amœnas, animi causa institutas, deflexum est. Constat tamen nonnullos sparsim in utraque Academia (veteri et nova), multo magis inter Scepticos, Acatalepsiam istam simpliciter et integre tenuisse.[1] Verum in hoc maxime ab illis peccatum est, quod sensuum perceptiones calumniabantur; unde Scientias radicitus evellebant. Sensus vero, licet sæpenumero homines aut fallant aut destituant, possint tamen multa adjuti industria ad scientias sufficere; idque non tam ope instrumentorum (licet et hæc quoque aliqua ex parte prosint) quam experimentorum ejus generis, quæ objecta subtiliora quam pro sensus facultate ad objecta sensu comprehensibilia producere queant. Debuerant autem potius defectum hac in parte imputasse mentis tum erroribus tum contumaciæ (quæ rebus ipsis morigera esse recusat), et pravis demonstrationibus, et modis ratiocinandi et concludendi ex perceptione sensuum perperam institutis. Hæc autem loquimur, non quo intellectui detrahatur, aut negotium totum deseratur; sed quo intellectui auxilia commoda comparentur et subministrentur, quibus rerum ardua et naturæ obscuritatem vincere possunt. Nemo enim tanta pollet manus constantia, aut etiam habitu, ut rectam lineam ducere aut perfectum circulum circumscribere manu libera possit; quod tamen ope regulæ, aut circini, facere in promptu est. Hæc igitur res ipsa est quam paramus, et ingenti conatu molimur; ut scilicet mens per artem fiat rebus par, utque inveniatur Ars quædam Indicii et Directionis, quæ cæteras artes earumque axiomata atque opera detegat et in conspectum det. Hanc enim merito *desiderari* posuimus.

Ars ista Indicii (ita enim eam appellabimus) duas habet partes. Aut enim defertur Indicium *ab experimentis ad experimenta;* aut *ab experimentis ad axiomata,* quæ et ipsa *nova expe-*

[1] There is something very striking in one of the earliest expressions of this way of thinking: —

Καὶ τὸ μὲν οὖν σαφὲς οὔτις ἀνὴρ ἴδεν, οὐδέ τις ἔσται
εἰδὼς ἀμφὶ θεῶν τε καὶ ἅσσα λέγω περὶ πάντων,
εἰ γὰρ καὶ τὰ μάλιστα τύχοι τετελεσμένον εἰπὼν
αὐτὸς ὅμως οὐκ οἶδε, δόκος δ' ἐπὶ πᾶσι τέτυκται.

XENOPHANES, apud Sextum Empiricum.

rimenta designent. Priorem harum Experientiam Literatam[1] nominabimus, posteriorem vero Interpretationem Naturæ, sive Novum Organum. Prior quidem (ut alibi attigimus[2]) vix pro Arte habenda est aut parte Philosophiæ, sed pro Sagacitate quadam; unde etiam eam Venationem Panis (hoc nomen ex fabula mutuati) quandoque appellamus. Attamen quemadmodum possit quis in via sua triplici modo progredi; aut cum *palpat ipse in tenebris;* aut cum *alterius manu ducatur, ipse parum videns;* aut denique cum *vestigia lumine adhibito regat:* similiter cum quis *experimenta omnigena absque ulla serie aut methodo tentet,* ea demum mera est palpatio; cum vero *nonnulla utatur in experimentando directione et ordine,* perinde est ac si manu ducatur: atque hoc illud est quod per Experientiam Literatam intelligimus. Nam *Lumen ipsum,* quod tertium fuit, ab Interpretatione Naturæ, sive Novo Organo, petendum est.

Literata Experientia, sive Venatio Panis, modos experimentandi tractat. Eam (cum *desiderari* posuerimus, neque res

[1] With reference to the question how far Bacon thought it possible for observation to be carried on apart from theory (see General Preface, p. 61.), it is, I think, important to remark that this notion of an Experientia *Literata*, as an intermediate step between simple experimentation *absque ullâ serie aut methodo* and the Interpretation of Nature, was not an after-thought, but formed part of his original design in the earliest shape in which it is known to us. "This part of Invention (he says in the *Advancement of Learning*) concerning the Invention of Sciences, I purpose (if God give me leave) hereafter to propound: having digested it into two parts: whereof the one I term *Experientia literata*, and the other *Interpretatio naturæ; the former being but a degree or rudiment of the latter.*" Now if he meant by "Experientia literata" the same thing which he describes here, or anything like it, — which I see no reason to doubt — he must have seen even then the impossibility of making a collection of facts sufficient for the purposes of Interpretation without the help of some principle of arrangement, some "series et methodus," some "sagacitas" in seeking and selecting; which necessarily implied some amount of *theory*. Such theory was indeed to be provisional only, and subject at all times to revision. It was not to be allowed as an axiom. But it does not appear that he would have put any other restriction upon the exercise of human sagacity in this way. The process might have been carried therefore to an indefinite length, and the further the better. And though it may be true that no amount of diligence and sagacity could ever have made a collection of facts complete *enough* to lead to the discovery of Forms by the method of the *Novum Organum*, it seems impossible to fix a point beyond which, through successive reductions of particular phenomena and groups of phenomena under laws more and more general, further progress could not have been made towards the highest law which includes them all. And such progress men have in fact been making ever since Bacon's time; the whole of our experimental philosophy being what he, I think, would have described as *Experientia literata*, and allowed as legitimate and successful — so far as it goes. Whether, if he could see the results which it has produced during the last two hundred years, he would still believe in the possibility of arriving ultimately at what he would have called "the *Interpretation of Nature*" may be doubted; but that if this "hunt of Pan" were conducted as skilfully and assiduously by the whole body of inquirers through the entire field of nature as it has been by particular inquirers in particular fields, we should be able to approach much nearer to such a consummation than anybody now imagines — this I cannot doubt that he would still believe. — *J. S.*

[2] See Nov. Org. i. 100.

sit plane perspicua) pro more et instituto nostro aliquatenus adumbrabimus. Modus Experimentandi præcipue procedit, aut per Variationem Experimenti; aut per Productionem Experimenti; aut per Translationem Experimenti; aut per Inversionem Experimenti; aut per Compulsionem Experimenti; aut per Applicationem Experimenti; aut per Copulationem Experimenti; aut denique per Sortes Experimenti. Universa vero ista cohibita sunt citra Terminos Axiomatis alicujus inveniendi. Illa enim altera pars de Novo Organo omnem Transitionem Experimentorum in Axiomata, aut Axiomatum in Experimenta, sibi vindicat.

Variatio Experimenti fit primo in Materia; scilicet quando Experimentum in jam cognitis, certæ materiæ fere adhæsit; nunc vero in illis quæ similis sunt speciei tentetur; veluti *Confectio Papyri* in pannis linteis tantum probata est, in sericis minime, (nisi forte apud Chinenses); neque rursus in filaceis, compositis ex setis et pilis, ex quibus conficitur (quod vocamus) Camelotum; neque denique in laneis, gossipio[1], et pellibus; quanquam hæc tria postrema magis esse videntur heterogenea; itaque admisceri possint potius quam per se utilia esse. Item *insitio* in arboribus fructiferis in usu est; in arboribus silvestribus raro tentata; licet perhibetur ulmum in ulmum insitam miras producere foliorum umbras. Insitio etiam in floribus rara admodum est; licet hoc jam cœperit fieri in rosis muscatellis, quæ rosis communibus fœliciter inoculantur. Etiam *variationem in parte rei* inter *variationes in materia* ponimus. Videmus enim *surculum in trunco arboribus insitum* fœlicius pullulare, quam si terræ indatur. Cur non et semen cepæ capiti alterius cepæ viridis inditum fœlicius germinet, quam si nudæ terræ commissum fuerit? Atque hic *radix pro trunco* variatur; ut hæc res insitio quædam in radice videri possit. Variatio Experimenti fit secundo in Efficiente. *Radii Solis* per specula comburentia calore ita intenduntur, ut materiam quæ ignem facile concipiat accendere possint: num et radii Lunæ per eadem ad lenissimum aliquem gradum teporis actuari possunt; ut videamus, utrum corpora omnia cœlestia sint potestate[2]

[1] Cotton paper was known long before that made from rags. It seems probable that the art of making paper came to the west of Europe from Constantinople, and that our word quire, of which the equivalent in Low Latin is manus, is a token of its Greek origin, and means properly a handful of paper.

[2] The elements and their primary qualities (hot, cold, moist, dry), being confined to the sublunary part of the universe, nothing which lies beyond the region of fire, which is next to the orb of the moon, can, according to the school philosophy, be

calida? Item *calores radiosi*, per specula scilicet, intenduntur: num etiam calores opaci (quales sunt lapidum et metallorum antequam candeant) idem patiuntur, an potius sunt luminis in hac re partes nonnullæ?[1] Item *succinum et gagates fricata* paleas trahunt: num etiam et ad ignem tepefacta? Variatio Experimenti fit tertio in Quanto; circa quod diligens admodum est adhibenda cura, cum hoc multi circumstent errores. Credunt enim homines, aucta aut multiplicata quantitate, pro rata augeri aut multiplicari virtutem. Et hoc fere postulant et supponunt, tanquam res sit mathematicæ cujusdam certitudinis; quod omnino falsissimum est. *Globus plumbeus unius libræ* a turri demissus (puta) decem pulsuum spatio ad terram descendit: num globus duarum librarum, (in quo impetus iste motus, quem vocant, naturalis duplicari debet,) spatio quinque pulsuum terram feriet? At ille æquali fere tempore descendet, neque accelerabitur juxta rationem Quanti.[2] Item *sulphuris* (puta) *drachma una*, semilibræ chalybis admixta, eam fluere faciet et colliquari: num igitur uncia sulphuris quatuor libris chalybis ad colliquationem sufficiet? At illud non sequitur. Certum enim est, *obstinationem materiæ in patiente* per Quantitatem augeri amplius, quam *activitatem virtutis in agente*. Porro Nimium æque fallit ac Parum. Etenim in *excoctionibus et depurationibus metallorum* error est familiaris; ut ad excoctionem promovendam, aut calorem fornacis aut additamenti quod injiciunt molem augeant. At illa supra modum aucta operationem impediunt; propterea quod vi et acrimonia sua

actually or formally hot. But the heavenly bodies, as the sun manifestly is, may be hot *potestate* — that is, may have the power of heating whatever is susceptible of their operation. It is known that the moon's rays have never as yet been sufficiently concentrated to produce any perceptible degree of heat.

[1] The researches which Bacon here suggests, in which obscure radiant heat is dealt with in the same manner as luminous heat, have been recently carried on with great success, and have led to many interesting results. The question as to the nature of the essential or formal connexion between heat and light remains however as yet unanswered, though it may be hoped that it will shortly be satisfactorily solved.

Telesius, of whom more than of any one else Bacon was a follower, maintained that heat and light were "contubernales naturæ," and that where one was present the other must be present too. Bacon, with a more subtle insight into nature, proposed to trace the analogy which might exist between them in cases where, sensibly at least, the dogma of Telesius seemed unfounded.

[2] Long before the publication of the *De Augmentis*, the theory of the acceleration of falling bodies, which of course includes the fact that all bodies fall from rest with equal velocities (the resistance of the air being set aside), had been made known by Galileo The experiments which he made about the year 1590 to show the absurdity of the received opinion that the velocity of falling increases as the mass of the falling body led to his leaving Pisa, where he had made them, and where he had in consequence been involved in disputes with the adherents of the Peripatetic philosophy.

multum ex metallo puro in fumos vertant et asportent; ut et jactura fiat, et massa quæ remanet magis sit obstinata et dura. Debent igitur homines ludibrium illud mulieris Æsopi cogitare; quæ sperarat ex duplicata mensura hordei gallinam suam duo ova quotidie parituram. At illa impinguata nullum peperit. Prorsus non tutum fuerit alicui Experimento Naturali confidere, nisi facta fuerit probatio et in minore et in majore Quanto. Atque de Variatione Experimenti hactenus.

Productio Experimenti duplex; Repetitio, et Extensio; nimirum, cum aut *experimentum iteratur*, aut *ad subtilius quiddam urgetur*. Repetitionis exemplum tale sit. *Spiritus Vini* fit ex vino per distillationem unicam; estque vino ipso multo acrior et fortior: num etiam spiritus vini ipse destillatus, sive sublimatus, seipsum fortitudine æque superabit? At Repetitio quoque non absque fallacia est. Etenim tum secunda exaltatio prioris excessum non æquat, tum etiam sæpenumero per Iterationem Experimenti, post statum sive acmen quandam operationis, tantum abest ut progrediatur natura, ut potius relabatur. Judicium igitur in hac re adhibendum. Item *Argentum Vivum*, in linteo aut alias in medio plumbi liquefacti, cum refrigescere cœperit, insertum, stupefit, nec amplius fluit: num et idem argentum vivum, si sæpius immissum fuerit, ita figetur ut fiat malleabile? Extensionis exemplum tale sit: *Aqua in summo posita*, et pensilis facta, et per rostrum vitri oblongum in vinum dilutum immersa, separabit aquam a vino; vino in summum se paulatim recipiente, aqua in imo subsidente[1]: num etiam, quemadmodum vinum et aqua (corpora scilicet diversa) hoc ingenio separantur, possint quoque partes vini (corporis nimirum integri) subtiliores a crassioribus separari; ut fiat tanquam destillatio per pondus, et in summo reperiatur aliquid spiritui vini proximum, sed forte delicatius? Item *Magnes ferrum integrum trahit:* num etiam frustum magnetis, in dissolutione ferri im-

[1] This experiment is more minutely described in the *Sylva Sylvarum*, i. 14. The water in the inverted glass or phial is maintained by the pressure of the atmosphere at a higher level than that of the wine and water into which the neck of the vessel containing it is inserted, but as the density of the water is greater than that of the diluted wine, it is in a position of unstable equilibrium. But for friction &c. the equilibrium could not practically exist at all; and after a little while it ceases to do so, the water gradually subsiding to the bottom and forcing the wine and water or some part of it into the vessel, which originally contained only water. The water for a considerable time passes without mixing through the wine and water; but of course there is no separation between the wine and the portion of water with which it was originally mixed, and the experiment succeeds just as well with pure as with diluted wine.

mersum, ferrum ad se alliciet et se ferro obducet? Item, *Versorium Acus Nauticæ se ad polos mundi applicat:* num etiam eadem via et consecutione qua cœlestia? Videlicet, ut si quis acum in contrario situ, hoc est in puncto Australi, ponat, et paulisper teneat, ac deinde vim omittat; num forte acus ad Septentriones se conferet, eligendo potius rotare per occidentem in situm desideratum quam per orientem? Item, *Aurum argentum vivum, juxta positum, imbibit:* num vero aurum recipit illud argentum vivum intra se, sine extensione molis suæ, ut fiat massa quædam ipso auro ponderosior? Item, *Homines memoriæ serviunt collocando imagines personarum in locis:* num etiam idem assequentur (missis locis) et affingendo actiones aut habitus personis? Atque de Productione Experimenti hactenus.

Translatio Experimenti triplex; aut a *natura vel casu in artem;* aut *ab arte vel practica alia in aliam;* aut *a parte alicujus artis in partem diversam ejusdem.* Translationis a natura aut casu in artem innumera sunt exempla; adeo ut omnes fere artes mechanicæ a tenuibus initiis, natura aut casu præbitis, ortum habuerint. Adagio receptum erat, *Botrum contra botrum citius maturescere*[1]; id quod de mutuis amicitiæ operis et officiis increbuit. At nostri Cydræ (vini scilicet ex pomis) confectores hoc optime imitantur. Cavent enim, ne poma tundantur aut exprimantur, antequam nonnullo tempore in acervos conjecta mutuo contactu maturuerint; unde nimia potus aciditas emendetur. Item, *Iridum artificiosarum imitatio* ex aspersione spissa guttularum, ab Iridibus naturalibus ex nube roscida facili ductu translata est. Item *modus destillandi* vel ex alto peti, ex imbribus scilicet aut rore; vel ex humili illo experimento guttarum in patinis, ollis aquæ bullientis superimpositis, adhærentium, desumi potuit. *Tonitrua* autem et *Fulgura* imitari veritus quis esset, nisi operculum monachi illius chymici, magno impetu et fragore subito in sublime jactum, submonuisset. Verum quo hæc res magis exemplis abundet, eo pauciora adducere opus fuerit. Debuerant autem homines, si illis utilia inquirere vacaret, naturalia opificia et operationes

[1] This proverb Bacon doubtless took from Erasmus's collection. The *Promus*, which I have already mentioned, contains nearly 200 Latin proverbs (and this among the number) all of which are given by Erasmus. In more than one instance errors of Erasmus's are copied in Bacon's extract, so that there can be no doubt as to the source from which he derived them. See for the proverb in the text, Erasm. iii. 2. 49.

singulas attente et minutim et ex composito intueri; et secum perpetuo et acriter cogitare, quænam ex ipsis ad artes transferri possint. Speculum enim artis natura. Nec pauciora sunt Experimenta, quæ ab Arte in Artem, seu a Practica in Practicam, transferri possunt; licet hoc rarius in usu sit. Natura enim ubique omnibus occurrit; at artes singulæ artificibus tantum propriis cognitæ sunt. *Specilla ocularia* ad visum debilem juvandum inventa sunt: num et comminisci quis queat aliquod instrumentum, quod auribus appensum surdastris ad audiendum juvet? Item, *imbalsamationes et mel cadavera conservant:* annon possit aliquid ex his in medicinam transferri, quod etiam vivis corporibus prosit? Item, *sigillorum practica* in cera, cæmentis, et plumbo antiqua fuit: at hæc etiam impressioni in chartis, sive arti typographicæ, viam monstravit. Item, *sal in coquinaria carnes condit,* idque melius hyeme quam æstate: annon hoc ad balnea utiliter transferri possit, eorumque temperamentum, quando opus fuerit, vel imprimendum vel extrahendum? Item *sal,* in nupero experimento de *conglaciationibus artificialibus,* magnas vires ad condensandum obtinere reperitur[1]: annon possit hoc transferri ad condensationes metallorum; cum jampridem notum sit aquas fortes, ex nonnullis salibus compositas, dejicere et præcipitare arenulas auri ex metallis aliquibus auro ipso minus densis[2]? Item, *Pictoria imagine memoriam rei renovat:* annon hoc traductum est in Artem eam, quam vocant, Memoriæ? De his in genere monitum sit; quod nihil ad imbrem quendam inventorum utilium, eorundemque novorum, veluti cœlitus deducendum tantum valere possit, quantum si experimenta complurium artium mechanicarum uni homini, aut paucis qui se invicem colloquiis acuere possint, in notitiam venerint; ut per hanc, quam dicimus, Experimentorum Translationem, artes se mutuo fovere et veluti commixtione radiorum accendere possint. Quamvis enim Via Rationalis per Organum longe majora spondeat,

[1] Bacon refers to the experiments exhibited by Drebbel in 1620. One of them was of a boat that would go under water. See Nelli's *Life of Galileo.* I have not been able to see the Chronicle of Alkmaar to which Nelli refers. It is said that in presence of James I. Drebbel produced an intolerable degree of cold in Westminster Hall.

[2] The experiment here referred to, which, as Professor Cumming has suggested to me, may not improbably have been an alchemist's trick, is not sufficiently described to make it possible to ascertain its nature. It appears probable, however, that it was based on a reduction of a solution of perchloride of gold in an excess of acid by some other metal. Of all metallic salts the perchloride of gold appears to be one of the most easy to decompose. Its reduction by a metal is employed as a gilding process.

attamen hæc Sagacitas per Experientiam Literatam plurima interim ex iis quæ in proximo sunt in genus humanum (tanquam missilia apud antiquos donativa[1]) projiciet et sparget. Superest illa Translatio de Parte Artis in Partem diversam; quæ parum differt a translatione de arte in artem. Verum quia artes nonnullæ spatia magna occupant, ut etiam Translationem Experimentorum ferre intra seipsas possint, hanc etiam speciem Translationis subjungere visum est. Præcipue, quia magni prorsus est in nonnulla arte momenti. Plurimum enim ad artem Medicinæ amplificandam profuerit, si experimenta partis illius medicinæ de Curationibus Morborum ad partes illas de Tuenda Sanitate et Prolongatione Vitæ transferantur. Si enim *opiatum aliquod insigne* ad spirituum in morbo pestilenti furibundam incensionem reprimendam suffecerit, non dubitet quispiam, quin simile aliquod, debita dosi familiare redditum, etiam incensionem eam gliscentem et obrepentem quæ per ætatem fit aliqua ex parte frænare et retardare possit. Atque de Translatione Experimenti hactenus.

Inversio Experimenti fit, cum contrarium ejus quod Experimento constat probatur. Exempli gratia; *Calidum per Specula intenditur:* num etiam Frigidum?[2] Item, *Calidum se diffundendo fertur tamen potius in sursum:* num etiam Frigidum se diffundendo fertur magis in deorsum? Exempli gratia; accipias bacillum ferreum, illudque in uno fine calefacias; et deinde erigas ferrum, parte calefacta subtus locata, in superiore parte manu apposita; actutum manum aduret; parte autem calefacta supra locata, et manu subtus, multo tardius aduret[3]: num etiam, si totum bacillum calefiat, et finis alter nive vel spongia in aqua frigida tincta madefiat; si nix aut spongia superius locetur, num (inquam) frigus deorsum mittet citius, quam inferius locata sursum? Item, *Radii Solis supra album dissiliunt, supra nigrum*

[1] See for an illustration of this phrase Sueton. in Calig. c. 18.

[2] With Bacon, as with the Peripaticians, cold is not the negation of heat; it is something positive — the opposite of heat, and not merely its absence. Prevost's experiment, in which two concave mirrors are placed opposite to one another with a piece of ice in the focus of the one and a thermometer in that of the other, shows that the effect apparently due to the radiation of cold may be made more intense in the manner which Bacon suggests: the real explanation of the phenomenon of course depends upon the "theory of exchanges."

[3] It is obvious that the difference arises simply from the circumstance that the air close to the hot end of the rod rises in the one case to that at which the hand is applied, and in the other case does not do so. In other words, in the first form of the experiment the effect of conduction is increased by that of convection, and in the second is not.

congregantur: num etiam umbræ super nigrum disperduntur, super album congregantur? Id quod in loco tenebroso, luce per foramen exiguum tantum immissa, fieri videmus; ubi imagines rerum quæ foras sunt super papyrum quæ alba est excipiuntur, super nigram minime. Item, *Vena frontis ad dolorem hemicranicum inciditur;* num etiam hemicranium scarificatur ad sodam?[1] Atque de Inversione Experimenti hactenus.

Compulsio Experimenti fit, ubi urgetur et producitur Experimentum ad annihilationem vel privationem virtutis; in reliquis enim venationibus fera capitur tantum, at in ista occiditur. Exemplum Compulsionis tale est. *Magnes ferrum trahit:* urge ergo ferrum, aut urge magnetem, ut amplius non fiat attractio; veluti, num forte si magnes ustus fuerit, aut in aquis fortibus maceratus, virtutem suam deponet, aut saltem remittet? Contra, si chalybs aut ferrum in Crocum Martis redigatur, vel in chalybem quem vocant præparatum[2], vel etiam in aqua forti solvatur, num adhuc ea alliciat magnes? Rursus: *magnes ferrum trahit per universa,* quæ novimus, *media;* nempe si interponatur aurum, argentum, vitrum: urge igitur aliquod medium, si fieri possit, quod virtutem intercipiat; probetur argentum vivum; probentur oleum, gummi, carbo ignitus, et alia quæ adhuc probata non sunt. Item, introducta sunt nuper *Perspicilla quæ visibilia minuta miris modis multiplicent:* urge usum eorum, vel ad species tam pusillas ut amplius non valeant, vel ita grandiusculas ut confundantur. Scilicet, num poterint illa in urina clare detegere ea quæ alias non perspicerentur? Num poterint in gemmis, ex omni parte puris et nitidis, grana aut nubeculas conspicienda dare? Num et pulviscula in sole (quæ Democrito pro atomis suis et principiis rerum falsissime objiciebantur[3]) tanquam corpora grandiuscula monstrare? Num pulverem crassiusculum ex cinnabari et cerussa ita ostendere distributum, ut appareant hic granula rubra, illic alba? Num rursus imagines majores (puta faciem,

[1] Soda is a low Latin word for a headache. The context appears to require that it should be a pain in the forehead, in order to establish an *ἀναλογία* between the two complaints and their remedies.

[2] The chalybs præparatus here mentioned is apparently that which is obtained by the following process: "Limatura chalybis sic præparatur subtilissimè; teritur in mortario æneo, et setaceo cribratur, et decem dies in aceto infunditur, et remoto aceto aduritur; et conservetur." See Amerinus (1535), p. 142. In another work of about the same date (that of Franciscus ab Alexandris), scoriæ are recommended instead of filings.

[3] Democritus maintained the absolute invisibility of his atoms. See Sextus Empiricus, *Adv. Logic,* i. 135., ii. 6. and elsewhere.

oculum, &c.) in tantum multiplicatas ostendere, in quantum pulicem aut vermiculum? Num byssum, aut hujusmodi textile linteum delicatius et paulo apertius, ita foraminatum ostendere, ac si esset rete? Verum in Compulsionibus Experimentorum minus moramur, quia fere extra limites Experientiæ Literatæ cadunt, et ad Causas et Axiomata et Novum Organum potius spectant. Ubicunque enim fit negativa, aut privativa, aut exclusiva, cœpit jam præberi lux nonnulla ad Inventionem Formarum. Atque de Compulsione Experimenti hactenus.

Applicatio Experimenti nihil aliud est, quam ingeniosa traductio ejus ad experimentum aliud aliquod utile. Exemplum tale sit. *Corpora quæque suas habent dimensiones, sua pondera:* aurum plus ponderis, minus dimensionis, quam argentum; aqua, quam vinum. Ab hoc traducitur experimentum utile; ut ex mensura impleta, et pondere excepto, possis dignoscere quantum argenti fuerit admixtum auro, vel aquæ vino; quod fuit *εὕρηκα* illud Archimedis.[1] Item, *Carnes in nonnullis cellis citius putrefiunt quam in aliis:* utile fuerit experimentum hoc traducere ad dignoscendos aëres magis aut minus salubres ad habitationem; ubi scilicet carnes diutius vindicentur a putredine. Possit idem applicari ad revelandas salubriores aut pestilentiores tempestates anni. Verum innumera sunt ejusmodi. Evigilent modo homines, et oculos perpetuo alias ad naturam rerum alias ad usus humanos vertant. Atque de Applicatione Experimenti hactenus.

Copulatio Experimenti est applicationum nexus et catena; cum quæ singula profutura non fuissent ad usum aliquem, connexa valeant. Exempli gratia; *Rosas aut fructus serotinos habere cupis:* hoc fiet, si gemmas præcociores avellas; idem fiet, si radices usque ad ver adultum denudes, et aëri exponas;

[1] The *εὕρηκα* of Archimedes related to the discovery of a method of determining the specific gravity of a body which could not be made "implere mensuram." If he had had a crown of pure gold of the same size and form as the suspected one, he need only have weighed the one against the other; and if the latter were lighter, the question as to its being alloyed would have been settled. Or if he had been at liberty to melt down a portion of the crown and to run it into a mould in which a piece of pure gold had previously been moulded, he might then have weighed them and determined which was the heaviest. But the problem he had to solve was quite different from this, and required the application of the principles of hydrostatics. Yet both here and in the *Historia Densi et Rari* Bacon refers to the discovery of Archimedes without distinguishing between his own inartificial method of determining specific gravities (which consisted in filling a measure with different substances and then weighing it) and that of Archimedes. Bacon's results are wonderfully accurate (with one remarkable exception), considering the manner in which they were obtained.

at multo magis, si copuletur utrunque. Item, *ad refrigerandum maxime faciunt glacies et nitrum;* utrunque commixtum multo magis. Verum et hæc res per se perspicua est. Attamen fallacia ei sæpe subesse possit, (ut et omnibus, ubi desunt Axiomata,) si copula fiat ex rebus quæ diversis et quasi pugnantibus modis operantur. Atque de Copulatione Experimenti hactenus.

Restant Sortes Experimenti. Hic vero experimentandi modus plane irrationalis est, et quasi furiosus; cum aliquid experiri velle animum subeat, non quia aut ratio aut aliquod aliud experimentum te ad illud deducat, sed prorsus quia similis res adhuc nunquam tentata fuit. Haud tamen scio, an in hac ipsa re (de qua nunc agimus) non aliquid magni lateat; si, inquam, omnem lapidem in natura moveas. Magnalia enim naturæ fere extra vias tritas et orbitas notas jacent, ut etiam absurditas rei aliquando juvet. At si ratio simul comitetur; id est, ut et manifestum sit simile experimentum nunquam tentatum fuisse, et tamen causa subsit magna cur tentetur; tum vero hæc res ex optimis est, et plane sinus naturæ excutit. Exempli gratia; *in operatione ignis super aliquod corpus naturale* alterum horum hactenus semper evenit, ut aut aliquid evolet, (veluti flamma et fumus in combustione vulgari,) aut saltem fiat separatio partium localis et ad nonnullam distantiam; ut in destillatione, ubi fæces subsident, vapores in receptacula, postquam luserint, congregantur. At *destillationem clausam* (ita enim eam vocare possumus) nemo mortalium adhuc tentavit. Verisimile autem videtur vim caloris, si intra claustra corporis sua in alterando edat facinora, cum nec jactura fiat corporis nec etiam liberatio, tum demum hunc Materiæ Proteum, veluti manicis detentum, ad complures transformationes adacturam; si modo calor ita temperetur et alternetur ut non fiat vasorum confractio. Est enim hæc res matrici similis naturali, ubi calor operatur, nihil corporis aut emittitur aut separatur[1]; nisi quod in matrice conjungatur alimentatio; verum, quatenus ad versionem, eadem res videtur. Tales igitur sunt Sortes Experimenti.

Illud interim circa hujusmodi Experimenta monemus; ut nemo animo concidat, aut quasi confundatur, si experimenta quibus incumbit expectationi suæ non respondeant. Etenim

[1] This notion of the matrix being a closed receptacle in which great results arise from the continuous application of heat under certain conditions is taken from Telesius. See the *De Rerum Naturâ*, vi. 23.

quod succedit magis complacet; at quod non succedit sæpenumero non minus informat. Atque illud semper in animo tenendum, (quod perpetuo inculcamus,) Experimenta Lucifera etiam adhuc magis quam Fructifera ambienda esse. Atque de Literata Experientia hæc dicta sint, quæ (ut jam ante diximus) *Sagacitas* potius est et odoratio quædam venatica, quam *Scientia*. De Novo Organo autem silemus, neque de eo quicquam prælibamus; quoniam de eo (cum sit res omnium maxima) opus integrum (annuente favore divino) conficere nobis in animo est.[1]

CAPUT III.

Partitio Inventivæ Argumentorum in Promptuariam *et* Topicam. *Partitio Topicæ in* Generalem *et* Particularem. *Exemplum Topicæ Particularis, in Inquisitione De Gravi et Levi.*

Inventio Argumentorum *inventio* proprie non est. *Invenire* enim est ignota detegere, non ante cognita recipere aut revocare. Hujusce autem Inventionis usus atque officium non aliud videtur, quam ex massa scientiæ, quæ in animo congesta et recondita est, ea quæ ad rem aut quæstionem institutam faciunt dextre depromere. Nam cui parum aut nihil de subjecto quod proponitur innotuit, ei Loci Inventionis non prosunt; contra, cui domi paratum est quod ad rem adduci possit, is etiam absque arte et Locis Inventionis, argumenta tandem (licet non ita expedite et commode) reperiet et producet. Adeo ut hoc genus Inventionis (sicut diximus) Inventio proprie non sit; sed reductio tantum in memoriam, sive suggestio cum applicatione. Attamen, quoniam vocabulum invaluit et receptum est, vocetur sane Inventio; siquidem etiam feræ alicujus venatio, et *inventio*, non minus cum illa intra vivariorum septa indagetur quam cum

[1] It has been inferred from this passage that this part of the *De Augmentis* was written before the publication of the *Novum Organum*. But it must be remembered that the *Novum Organum*, which was published in 1620, was not an *opus integrum*. Writing to Fulgenzio *after* the publication of the *De Augmentis*, Bacon says, "Debuerat sequi Novum Organum; interposui tamen scripta mea moralia et politica, *quia magis erant in promptu*. Hæc sunt, &c. . . . . Tum demum sequetur Organum Novum, cui secunda pars adhuc adjicienda est, quam animo jam complexus et metitus sum." Afterwards he seems to have come to the conclusion that a sample of Natural History was more urgently wanted, and therefore postponed the completion of the *Novum Organum* until he had finished the *Sylva Sylvarum*, which, according to Dr. Rawley, was his last work; and it does not appear that any portion of the second part was ever written. —*J. S.*

in saltibus apertis, dici possit. Missis vero verborum scrupulis, illud constet; scopum et finem hujusce rei esse promptitudinem quandam, et expeditum usum cognitionis nostræ, potius quam ejusdem amplificationem aut incrementum.

Atque ut parata sit ad disserendum copia, duplex ratio iniri potest; aut ut designetur, et quasi indice monstretur, ad quas partes rem indagare oporteat; atque hæc est ea, quam vocamus *Topicam;* aut ut jam antea composita sint et in usum reposita argumenta circa eas res quæ frequentius incidunt et in disceptationem veniunt; atque hanc *Promptuariam* nominabimus. Hæc autem posterior tanquam Scientiæ pars vix dici meretur; cum in diligentia potius consistat, quam in eruditione aliqua artificiosa. Veruntamen hac in parte Aristoteles, ingeniose quidem sed tamen damnose, sophistas sui temporis deridet, inquiens; *Perinde illos facere ac si quis calcearium professus rationem calcei conficiendi non doceret, sed exhiberet tantum calceos complurimos diversæ tam formæ quam magnitudinis.*[1] Attamen hic regerere liceat; calcearium, si in officina nil calceorum haberet, neque eos consueret nisi rogatus, egenum prorsus mansurum et perpaucos inventurum emptores. Sed longe aliter Salvator noster, de Divina Scientia verba faciens, inquit; *Omnis scriba doctus in regno cœlorum similis est homini patrifamilias qui profert de thesauro suo nova et vetera.*[2] Videmus etiam priscos rhetores oratoribus præcepisse, ut præsto haberent Locos Communes varios, jampridem adornatos, et in utramque partem tractatos et illustratos. Exempli gratia: *Pro Sententia legis, adversus Verba legis; et e contra: Pro fide Argumentorum, adversus Testimonia; et e contra.* Cicero autem ipse, longa doctus experientia, plane asserit posse oratorem diligentem et sedulum jam præmeditata et elaborata habere quæcunque in disceptationem venient; adeo ut in causæ ipsius actione nihil novum aut subitum inseri necesse fuerit, præter nomina nova et circumstantias aliquas speciales.[3] At Demosthenis diligentia et sollicitudo eo usque processit, ut quoniam primus ad causam aditus et ingressus ad animos auditorum præparandos plurimum virium haberet, operæ pretium putaret complura concionum et orationum exordia componere, et in promptu habere. Atque hæc exempla et authoritates merito Aristotelis opinioni præponderare possint,

[1] Arist. De Repreh. Sophist. ii. 9.
[2] St. Matt. xiii. 52.
[3] De Oratore, ii. 32—34.

qui nobis author foret ut *vestiarium* cum *forfice* commutaremus. Itaque non fuit omittenda hæc pars doctrinæ circa Promptuariam, de qua hoc loco satis. Cum enim sit utrique, tam Logicæ quam Rhetoricæ, communis; visum est eam hic inter Logica cursim tantum perstringere, pleniorem ejus tractationem ad Rhetoricam rejicientes.

Partem alteram Inventivæ (nimirum *Topicam*) partiemur in Generalem et Particularem. Generalis illa est, quæ in Dialectica diligenter et abunde tractata est; ut in ejus explicatione morari non sit opus. Illud tamen obiter monendum videtur, Topicam istam non tantum in argumentationibus, ubi cum aliis manum conserimus, verum et in meditationibus, cum quid nobiscum ipsi commentamur aut revolvimus, valere; imo neque solummodo in hoc sitam esse, ut inde fiat suggestio aut admonitio quid *affirmare* aut *asserere;* verum etiam quid *inquirere* aut *interrogare* debeamus. At prudens Interrogatio quasi dimidium scientiæ. Recte siquidem Plato; *Qui aliquid quærit, id ipsum quod quærit generali quadam notione comprehendit; aliter qui fieri potest, ut illud cum fuerit inventum agnoscat?* [1] Idcirco, quo amplior et certior fuerit Anticipatio nostra, eo magis directa et compendiosa erit Investigatio. Iidem igitur illi Loci qui ad intellectus nostri sinus intra nos excutiendos et congestam illic scientiam depromendam conducent, etiam ad scientiam extrinsecus hauriendam juvabunt; ita ut si præsto fuerit quis rei gnarus et peritus, commode et prudenter de ea interrogari a nobis possit; et similiter authores, et libri, et partes librorum, qui nos de iis quæ quærimus edoceant et informent, utiliter deligi et evolvi.

At Topica Particularis ad ea quæ dicimus longe confert magis, et pro re fructuosissima habenda est. Illius certe mentio levis a nonnullis scriptoribus facta est; sed integre, et pro rei dignitate, minime tractata. Verum missum facientes vitium illud et fastum, quæ nimium diu regnarunt in scholis; videlicet, ut quæ præsto sint infinita subtilitate persequantur, quæ paulo remotiora ne attingant quidem; nos sane Topicam Particularem tanquam rem apprime utilem amplectimur; hoc est, Locos Inquisitionis et Inventionis, particularibus subjectis et scientiis appropriatos. Illi autem mixturæ quædam sunt, ex Logica et Materia ipsa propria singularum scientiarum.

[1] Bacon doubtless refers to the *Meno*, ii. p. 80., of Stephens.

Futilem enim esse constat et angusti cujusdam animi, qui existimet artem de scientiis inveniendis perfectam jam a principio excogitari et proponi posse; eandemque postea in opere poni et exerceri debere. At certo sciant homines, *Artes inveniendi solidas et veras adolescere et incrementa sumere cum ipsis inventis;* adeo ut cum quis primum ad perscrutationem scientiæ alicujus accesserit, possit habere Præcepta Inventivæ nonnulla utilia; postquam autem ampliores in ipsa scientia progressus fecerit, possit etiam et debeat nova Inventionis Præcepta excogitare, quæ ad ulteriora eum fœlicius deducant. Similis est sane hæc res viæ initæ in planitie; postquam enim viæ partem aliquam fuerimus emensi, non tantum hoc lucrati sumus ut ad exitum itineris propius accesserimus, verum etiam ut quod restat viæ clarius prospiciamus. Eodem modo, in Scientiis, gradus itineris quisque, ea quæ a tergo reliquit prætervectus, etiam illa quæ supersunt propius dat in conspectum. Hujus autem Topicæ Exemplum, quoniam eam inter Desiderata reponimus, subjungere visum est.

Topica Particularis, sive Articuli Inquisitionis de Gravi et Levi.

1. Inquiratur, qualia sint corpora quæ Motus Gravitatis sunt susceptibilia; qualia, quæ Levitatis; et si quæ sint mediæ, sive Adiaphoræ Naturæ?

2. Post Inquisitionem de Gravitate et Levitate Simplicem, procedatur ad Inquisitionem Comparatam; quæ nimirum ex Gravibus plus, quæ minus ponderent, in eodem dimenso? Etiam, quæ ex Levibus celerius ferantur in altum, quæ tardius?

3. Inquiratur de eo quod possit et operetur Quantum Corporis ad Motum Gravitatis.[1] Atqui videatur hoc primo aspectu quasi supervacuum; quia rationes Motus debeant sequi rationes Quanti: sed res aliter se habet. Nam licet in lancibus Quantitas Gravitatem corporis ipsius compenset (viribus corporis undique coëuntibus per repercussionem sive resistentiam lancium vel trabis), tamen ubi parva datur resistentia, (veluti in decasu corporum per aërem) Quantum Corporis parum valet ad Incitationem Descensus; cum viginti pondo plumbi, et libra una, eodem fere spatio cadant.

[1] See note 2. p. 625.

4. Inquiratur, utrum Quantum Corporis ita augeri possit, ut Motus Gravitatis prorsus deponatur; ut fit in globo terræ, qui pensilis est, non cadit? Utrum igitur possint esse aliæ massæ tam grandes, ut se ipsæ sustentent? Nam latio ad centrum terræ res fictitia est; atque omnis massa grandis motum lationis quemcunque exhorret, nisi ab alio appetitu fortiori vincatur.

5. Inquiratur de eo quod possit et operetur Resistentia Corporis Medii, vel occurrentis, ad Regimen Motus Gravitatis. Corpus vero descendens aut penetrat et secat corpus occurrens, aut ab eo sistitur. Si penetret, fit penetratio aut cum levi resistentia, ut in aëre; aut cum fortiori, ut in aqua. Si sistatur, sistitur aut resistentiâ dispari, ubi fit prægravatio, ut si lignum superponatur ceræ; aut æqua, veluti si aqua superponatur aquæ, aut lignum ejusdem generis ligno; id quod appellat schola (apprehensione quadam inani) *Non ponderare corpus nisi extra locum suum.*[1] Atque hæc omnia motum Gravitatis variant. Aliter enim moventur Gravia in lancibus, aliter in decasu; etiam aliter (quod mirum videri possit) in lancibus pendentibus in aëre, aliter in lancibus immersis in aqua; aliter in decasu per aquam, aliter in natantibus sive vectis super aquam.

6. Inquiratur de eo quod possit et operetur Figura Corporis Descendentis ad regendum motum Gravitatis; veluti figura lata cum tenuitate, cubica, oblonga, rotunda, pyramidalis; et quando se vertant corpora, quando eadem qua dimittuntur positura permaneant.

7. Inquiratur de eo quod possit et operetur Continuatio et Progressio ipsius casus sive descensus, ad hoc, ut majori incitatione et impetu feratur; et qua proportione, et quo usque invalescat illa incitatio? Siquidem veteres levi contemplatione opinati sunt (cum motus naturalis sit iste) eum perpetuo augeri et intendi.

8. Inquiratur de eo quod possit et operetur Distantia aut

[1] This dictum was undoubtedly commonly received, yet it is opposed to the express statement of Aristotle,—*ἐν τῇ αὐτοῦ γὰρ χώρᾳ πάντα βάρος ἔχει πλὴν πυρὸς καὶ ὁ ἀήρ.* —*De Cœl.* iv. 4. But we find in the commentary of Simplicius, that Ptolemy maintained on experimental grounds that *ἐν τῇ ἑαυτοῦ χώρᾳ οὔτε τὸ ὕδωρ οὔθ' ὁ ἀὴρ ἔχει βάρος.* See the *Scholia in Arist.* of Brandis, p. 517. Themistius held the same opinion as Ptolemy. Aristotle's meaning is thus explained away by Averroës: "Per gravitatem innuit ipsam proclivitatem et passionem, quæ in eo est ad moveri deorsum, modico quocunque patrocinio eveniente, iccirco et in proprio sibi loco quoquomodo gravitatem habet magis quam levitatem, eo quod magis inclinatur recipere motum deorsum quam motum sursum." — *Paraph.* in quarto *De Cœlo.*

Proximitas corporis descendentis a Terra, ad hoc, ut celerius cadat, aut tardius, aut etiam non omnino (si modo fuerit extra orbem activitatis globi terræ, quæ Gilberti opinio fuit[1]); atque simul de eo quod operetur Immersio Corporis Descendentis magis in Profundo Terræ, aut Collocatio ejusdem propius ad Superficiem Terræ. Etenim hæc res etiam motum variat, ut operantibus in mineris perspectum est.

9. Inquiratur de eo quod possit et operetur Differentia Corporum, per quæ motus Gravitatis diffunditur et communicatur: atque utrum æque communicetur per corpora mollia et porosa, ac per dura et solida; veluti si trabs lancis sit ex altera parte lingulæ lignea, ex altera argentea (licet fuerint reductæ ad idem pondus), utrum non progignat variationem in lancibus? Similiter, utrum Metallum, Lanæ aut Vesicæ inflatæ superimpositum, idem ponderet quod in fundo lancis?

10. Inquiratur de eo quod possit et operetur in communicatione motus Gravitatis Distantia Corporis a Libramine; hoc est, cita et sera perceptio incubitus, sive depressionis; veluti in lancibus, ubi altera pars trabis est longior (licet reducta ad idem pondus), an inclinet hoc ipsum lancem? aut in tubis arcuatis, ubi longior pars certe trahet aquam, licet brevior pars (facta scilicet capacior) majus contineat pondus aquæ.[2]

11. Inquiratur de eo quod possit Intermixtio sive Copulatio Corporis Levis cum Corpore Gravi ad elevandam corporis Gravitatem; ut in pondere animalium vivorum, et mortuorum?

12. Inquiratur de secretis Ascensibus et Descensibus Partium Leviorum et Graviorum in uno corpore integro; unde fiant sæpe accuratæ separationes; ut in separatione vini et aquæ, in ascensione floris lactis, et similibus?

13. Inquiratur, quæ sit Linea et Directio Motus Gravitatis; et quatenus sequatur vel centrum terræ, id est massam terræ, vel centrum corporis ipsius[3], id est, nixum partium ejus. Centra enim illa ad demonstrationes apta sunt; in natura nihil valent.

14. Inquiratur de Comparatione motus Gravitatis cum mo-

[1] See note 1. at p. 526.

[2] The theory of the lever, to which the first part of this inquiry relates, was as well understood in Bacon's time as it is now; that of the siphon, inasmuch as it depends on the idea of atmospherical pressure, was then unknown, and could not be established until this idea was introduced by Torricelli. The experiment which bears his name, and which was in effect the construction of a mercurial barometer, corresponds in the history of physics to the invention of the telescope in that of astronomy.

[3] That is, the centre of gravity.

tibus aliis; quos scilicet vincat, quibus cedat? Veluti in Motu (quem appellant) Violento motus Gravitatis compescitur ad tempus.[1] Etiam, cum pondus longe majus ferri ab exiguo magnete attollitur, cedit motus Gravitatis motui Sympathiæ.

15. Inquiratur de Motu Aëris; utrum feratur sursum, an sit tanquam adiaphorus? Quod difficile est inventu, nisi per experimenta aliqua exquisita. Nam emicatio aëris in fundo aquæ fit potius per plagam aquæ, quam per motum aëris; cum idem etiam fiat in ligno. Aër autem aëri commixtus nihil prodit, cum non minus levitatem exhibeat aër in aëre, quam gravitatem aqua in aqua; in bulla autem, exili obducta pellicula, ad tempus stat.

16. Inquiratur, quis sit Terminus Levitatis? Neque enim quemadmodum centrum terræ posuerunt centrum gravitatis, volunt (credo) ut ultima convexitas cœli sit terminus levitatis: an potius, veluti gravia videntur eo usque ferri ut decumbant, et tanquam ad Immobile; ita levia eo usque ferantur ut rotari incipiant, et tanquam ad Motum sine Termino?

17. Inquiratur, quid in causa sit cur Vapores et Halitus eo usque in altum ac sita est regio (quam vocant) media aëris ferantur; cum et crassiusculæ sint materiæ, et radii solis per vices (noctu scilicet) cessent?

18. Inquiratur de Regimine Motus Flammæ in Sursum; quod eo abstrusius est, quia singulis momentis flamma perit, nisi forte in medio flammarum majorum: etenim flammæ, abruptæ a continuitate sua, parum durant.

19. Inquiratur de Motu in Sursum ipsius Activitatis Calidi; veluti cum calor in ferro candente citius gliscit in sursum, quam in deorsum?

Exemplum igitur Topicæ Particularis tale sit. Illud interim, quod monere occœpimus, iterum monemus; nempe ut homines debeant Topicas Particulares suas alternare, ita ut post majores progressus aliquos in inquisitione factos aliam et subinde aliam instituant Topicam, si modo scientiarum fastigia conscendere cupiant. Nos autem Topicis Particularibus tantum tribuimus, ut proprium opus de ipsis, in subjectis naturalibus dignioribus et obscurioribus, conficere in animo habeamus. Domini enim quæstionum sumus, rerum non item. Atque de Inventiva hactenus.

[1] In the Peripatetic philosophy it was believed that a projectile moves at first in a straight line, as if not acted on by gravity, and then falls perpendicularly.

CAPUT IV.

Partitio Artis Judicandi in Judicium per Inductionem *et per* Syllogismum; *quorum prius aggregatur Organo Novo. Partitio prima Judicii per Syllogismum in* Reductionem Rectam, *et* Inversam. *Partitio secunda ejus in* Analyticam, *et Doctrinam de* Elenchis. *Partitio Doctrinæ de Elenchis, in Elenchos* Sophismatum, *Elenchos* Hermeniæ, *et Elenchos* Imaginum *sive* Idolorum. *Partitio Idolorum in Idola* Tribus, *Idola* Specus, *et Idola* Fori. *Appendix Artis Judicandi, videlicet de* Analogia Demonstrationum pro Natura Subjecti.

Transeamus nunc ad Judicium, sive Artem Judicandi; in qua agitur de natura Probationum sive Demonstrationum. In Arte autem ista Judicandi (ut etiam vulgo receptum est) aut per Inductionem aut per Syllogismum concluditur. Nam Enthymemata et Exempla illorum duorum compendia tantum sunt. At quatenus ad Judicium quod fit per Inductionem, nihil est quod nos detinere debeat; uno siquidem eodemque mentis opere illud quod quæritur, et invenitur et judicatur. Neque enim per medium aliquod res transigitur, sed immediate, eodem fere modo quo fit in sensu. Quippe sensus, in objectis suis primariis, simul et objecti speciem arripit et ejus veritati consentit. Aliter autem fit in Syllogismo; cujus probatio immediata non est, sed per medium perficitur. Itaque alia res est Inventio Medii, alia Judicium de Consequentia Argumenti. Nam primo discurrit mens, postea acquiescit. At Inductionis formam vitiosam prorsus valere jubemus; legitimam ad Novum Organum remittimus. Itaque de Judicio per Inductionem hoc loco satis.

De illo altero per Syllogismum quid attinet dicere; cum subtilissimis ingeniorum limis hæc res fere attrita sit, et in multas minutias redacta? Nec mirum, cum sit res quæ cum intellectu humano magnam habeat sympathiam. Nam animus humanus miris modis ad hoc contendit et anhelat, ut non pensilis sit, sed nanciscatur aliquid fixum et immobile cui tanquam firmamento in transcursibus et disquisitionibus suis innitatur. Sane, quemadmodum Aristoteles probare conatur inveniri in omni motu corporum aliquid quod quiescit; et fabulam antiquam de Atlante, qui ipse erectus cœlum humeris sustinuit, pereleganter ad polos mundi traducit, circa quos conversiones

expediuntur[1]; similiter magno studio appetunt homines aliquem habere intra se cogitationum Atlantem, aut polos qui intellectus fluctuationes et vertigines aliquatenus regant; timentes scilicet, ne cœlum ipsorum ruat. Itaque ad principia scientiarum constituenda præpropere festinarunt, circa quæ omnis disputationum varietas verteretur, sine periculo ruinæ et casus; nescientes profecto, eum qui certa nimis propere captaverit in dubiis finiturum; qui autem judicium tempestive cohibuerit ad certa perventurum.

Manifestum est igitur, Artem hanc Judicandi per Syllogismum nihil aliud esse quam reductionem propositionum ad principia, per medios terminos. Principia autem consensu recepta intelliguntur, atque a quæstione eximuntur. At terminorum mediorum inventio libero ingeniorum acumini et investigationi permittitur. Est autem Reductio illa duplex; Directa scilicet, et Inversa. Directa est, cum ipsa propositio ad ipsum principium reducitur; id quod *Probatio Ostensiva* vocatur. Inversa est, cum contradictoria propositionis reducitur ad contradictorium principii; quod vocant *Probationem per Incommodum.* Numerus vero terminorum mediorum, sive scala eorum, minuitur aut augetur pro remotione propositionis a principio.

His positis partiemur Artem Judicii (sicut vulgo fere solet) in Analyticam, et Doctrinam de Elenchis. Altera indicat, altera cavet. Analytica enim veras formas instituit de consequentiis argumentorum; a quibus si varietur sive deflectatur, vitiosa deprehenditur esse conclusio; atque hoc ipsum in se elenchum quendam, sive redargutionem, continet. *Rectum enim* (ut dicitur) *et sui index est et obliqui.* Tutissimum nihilominus est Elenchos veluti monitores adhibere, quo facilius detegantur fallaciæ, judicium alioquin illaqueaturæ. In Analytica vero nihil desiderari reperimus; quin potius oneratur superfluis quam indiget accessionibus.

Doctrinam de Elenchis in tres partes dividere placet: Elenchos *Sophismatum;* Elenchos *Hermeniæ;* et Elenchos *Imaginum* sive *Idolorum.* Doctrina de Elenchis Sophismatum apprime utilis est. Quamvis enim pinguius fallaciarum genus a Seneca non inscite comparetur cum præstigiatorum technis, in quibus quo pacto res geratur nescimus, aliter autem se

[1] Arist. De Mot. Anim. 2 and 3.

habere rem quam videtur satis novimus[1]; subtiliora tamen Sophismata non solum id præstant ut non habeat quis quod respondeat, sed et judicium ipsum serio confundunt.

Hæc pars de Elenchis *Sophismatum* præclare tractata est ab Aristotele, quoad præcepta; etiam a Platone adhuc melius, quoad exempla; neque illud tantum in persona sophistarum antiquorum (Gorgiæ, Hippiæ, Protagoræ, Euthydemi, et reliquorum), verum etiam in persona ipsius Socratis, qui cum illud semper agat, ut nihil affirmet sed a cæteris in medium adducta infirmet, ingeniosissime objectionum, fallaciarum, et redargutionum modos expressit. Itaque in hac parte nihil habemus quod desideremus. Illud interim notandum; quamvis usum hujus doctrinæ probum et præcipuum in hoc posuerimus, ut redarguantur sophismata; liquido nihilominus patere, usum ejus degenerem et corruptum ad captiones et contradictiones per illa ipsa sophismata struendas et concinnandas spectare. Quod genus facultatis etiam pro eximio habetur, et haud parvas affert utilitates; licet eleganter introducta sit a quopiam illa differentia inter oratorem et sophistam, quod alter tanquam leporarius cursu præstet, alter tanquam lepus ipse flexu.

Sequuntur Elenchi *Hermeniæ;* ita enim (vocabulum potius quam sensum ab Aristotele mutuantes) eos appellabimus. Redigamus igitur hominibus in memoriam ea quæ a nobis de Transcendentibus et de Adventitiis Entium Conditionibus sive Adjunctis (cum de Philosophia Prima ageremus) superius dicta sunt. Ea sunt Majus, Minus; Multum, Paucum; Prius, Posterius; Idem, Diversum; Potentia, Actus; Habitus, Privatio; Totum, Partes; Agens, Patiens; Motus, Quies; Ens, Non Ens; et similia. Inprimis autem meminerint et notent differentes eas, quas diximus, harum rerum contemplationes; videlicet quod possint inquiri vel Physice, vel Logice. Physicam autem circa eas tractationem, Philosophiæ Primæ assignavimus. Superest Logica. Ea vero ipsa est res, quam in præsenti Doctrinam de Elenchis Hermeniæ nominamus. Portio certe est hæc doctrinæ sana et bona. Hoc enim habent notiones illæ generales et communes, ut in omnibus disputationibus ubique intercurrant; adeo ut nisi accurate et anxio cum judicio bene jam ab initio distinguantur, universo disputationum lumini caliginem miris modis offusuræ sint, et eo rem

[1] Senec. Epist. 45

fere deducturæ ut desinant disputationes in pugnas verborum. Etenim æquivocationes et malæ acceptiones verborum (præsertim hujus generis) sunt *Sophismata Sophismatum.* Quare etiam melius visum est istarum tractationem seorsum constituere, quam eam vel in Philosophiam Primam sive Metaphysicam recipere, vel ex parte Analyticæ subjicere, ut Aristoteles satis confuse fecit. Dedimus autem ei nomen ex usu, quia verus ejus usus est plane redargutio et cautio circa usum verborum. Quinimo partem illam de Prædicamentis, si recte instituatur, circa cautiones de non confundendis aut transponendis definitionum et divisionum terminis, præcipuum usum sortiri existimamus, et huc etiam referri malumus. Atque de Elenchis Hermeniæ hactenus.

Ad Elenchos vero *Imaginum*, sive *Idolorum*, quod attinet; sunt quidem Idola profundissimæ mentis humanæ fallaciæ. Neque enim fallunt in particularibus, ut cæteræ, judicio caliginem offundendo et tendiculas struendo; sed plane ex prædispositione mentis prava et perperam constituta, quæ tanquam omnes intellectus anticipationes detorquet et inficit. Nam Mens Humana (corpore obducta et obfuscata) tantum abest ut speculo plano, æquali, et claro similis sit (quod rerum radios sincere excipiat et reflectat), ut potius sit instar speculi alicujus incantati, pleni superstitionibus et spectris. Imponuntur autem intellectui Idola, aut per *naturam ipsam generis humani generalem;* aut per *naturam cujusque individualem;* aut per *verba* sive *naturam communicativam.* Primum genus Idola *Tribus*, secundum Idola *Specus*, tertium Idola *Fori* vocare consuevimus. Est et quartum genus, quod Idola *Theatri* appellamus, atque super-inductum est a *pravis theoriis* sive *philosophiis*, et *perversis legibus demonstrationum.* Verum hoc genus abnegari potest et deponi; itaque illud in præsentia omittemus. At reliqua plane obsident mentem, neque prorsus evelli possunt. Igitur non est, quod quis in istis Analyticam aliquam expectet; sed doctrina de Elenchis est circa ipsa Idola doctrina primaria. Neque (si verum omnino dicendum sit) doctrina de Idolis in artem redigi possit; sed tantum adhibenda est, ad ea cavenda, prudentia quædam contemplativa. Horum autem tractationem plenam et subtilem ad Novum Organum amandamus; pauca generaliter tantum de iis hoc loco dicturi.

Idolorum Tribus exemplum tale sit. *Natura intellectus humani magis afficitur Affirmativis et Activis quam Negativis et*

Privativis; cum rite et ordine æquum se utrique præbere debeat. At ille, si res quæpiam aliquando existat et teneat, fortiorem recipit de ea impressionem quam si eadem longe pluries fallat aut in contrarium eveniat. Id quod omnis superstitionis et vanæ credulitatis quasi radix est. Itaque recte respondit ille qui, cum suspensa tabula in templo monstraretur eorum qui vota solverant quod naufragii periculum effugissent, atque interrogando premeretur, annon tum demum Neptuni numen agnosceret? Quæsivit vicissim, *At ubi sunt illi depicti, qui post vota nuncupata perierunt?*[1] Atque eadem est ratio superstitionum similium, sicut in Astrologicis, Insomniis, Ominibus, et reliquis. Alterum exemplum est hujusmodi: *Animus humanus* (cum sit ipse substantia æqualis et uniformis) *majorem præsupponit et affingit in natura rerum æqualitatem et uniformitatem, quam revera est.* Hinc commentum mathematicorum, *In cœlestibus omnia moveri per circulos perfectos,* rejiciendo lineas spirales. Hinc etiam fit, quod, cum multa sint in natura *monodica* et plena imparitatis, affingat tamen semper cogitatio humana Relativa, Parallela, et Conjugata. Ab hoc enim fonte elementum ignis cum orbe suo introductum est, ad constituendam quaternionem cum reliquis tribus, terra, aqua, aëre. Chymici autem fanaticam instruxerunt rerum universarum phalangem, inanissimo commento inveniri fingentes in quatuor illis suis elementis (cœlo, aëre, aqua, et terra) species singulas parallelas invicem et conformes.[2] Tertium exemplum est superiori finitimum; quod *Homo fiat quasi Norma et Speculum Naturæ.* Neque enim credibile est (si singula percurrantur et notentur) quantum agmen Idolorum philosophiæ immiserit naturalium operationum ad similitudinem actionum humanarum reductio: hoc ipsum, inquam, quod putetur talia naturam facere qualia homo facit. Neque multo meliora sunt ista quam hæresis Anthropomorphitarum, in cellis ac solitudine stupidorum monachorum orta; aut sententia Epicuri huic ipsi in Paganismo respondens, qui Diis humanam figuram tribuebat. At non opus fuit Velleio Epicureo interrogare, *Cur Deus cœlum stellis et luminibus, tanquam ædilis, ornasset?*[3] Nam si summus ille opifex ad modum ædilis

[1] See Nov. Org. i. 46.

[2] See note on Nov. Org. i. 45.—*J. S.*

[3] Cicero De Nat. Deor. i. c. 9. Compare the following extract from Galileo's letter to Gallanzone Gallanzoni: — " Uno dei nostri più celebri architetti se avesse avuto a

se gessisset, in pulchrum aliquem et elegantem ordinem stellas digerere debuisset, operosis palatiorum laquearibus consimilem; cum e contra ægre quis ostendat in tam infinito stellarum numero figuram aliquam vel quadratam, vel triangularem, vel rectilinearem. Tanta est harmoniæ discrepantia inter spiritum hominis et spiritum mundi.

Quod ad Idola Specus attinet, illa ortum habent ex *propria cujusque natura et animi et corporis;* atque etiam ex *educatione* et *consuetudine,* et *fortuitis rebus,* quæ singulis hominibus accidunt. Pulcherrimum enim emblema est illud de Specu Platonis. Siquidem si quis (missa illa exquisita parabolæ subtilitate) a prima infantia in antro aut caverna obscura et subterranea ad maturam usque ætatem degeret, et tunc derepente in aperta prodiret, et hunc cœli et rerum apparatum contueretur; dubium non est, quin animum ejus subirent et perstringerent quamplurimæ miræ et absurdissimæ phantasiæ. Nos vero scilicet sub aspectu cœli degimus; interea tamen animi in cavernis corporum nostrorum conduntur; ut infinitas errorum et falsitatum imagines haurire necesse sit, si e specu sua raro tantum et ad breve aliquod tempus prodeant, et non in contemplatione naturæ perpetuo tanquam sub dio morentur. Emblemati siquidem illi de Specu Platonis[1] optime convenit parabola illa Heracliti, quod *homines scientias in mundis propriis et non in mundo majore quærant.*

At Idola Fori molestissima sunt, quæ *ex fœdere tacito inter homines de Verbis et Nominibus impositis* se in intellectum insinuarunt. Verba autem plerunque ex captu vulgi induntur, atque per differentias quarum vulgus capax est res secant; cum autem intellectus acutior aut observatio diligentior res melius distinguere velit, verba obstrepunt. Quod vero hujus remedium est (definitiones scilicet) in plurimis huic malo mederi nequit; quoniam et ipsæ definitiones ex verbis constent, et verba gignant verba. Etsi autem putemus verbis nostris nos imperare; et illud facile dictu sit, *Loquendum esse ut vulgus, sen-*

compartire nella gran volta del cielo la moltitudine di tante stelle fisse, credo io che distribuite le avrebbe con bei partimenti di quadrati, esagoni, ed ottangoli; interzando le maggiori tra le mezzane e le piccole, con sue intere correspondenze, parendogli in questo modo di valersi di belle proporzione: ma all' incontro Iddio, quasi che colla mano del caso le abbia disseminate, pare a noi che senza regola simmetria o eleganza alcuno le abbia colassù sparpagliate."

[1] Plato, Republ. vi. For the reference to Heraclitus, see the note 1. p. 164.

tiendum ut sapientes[1]; quinetiam vocabula artium (quæ apud peritos solum valent) huic rei satisfacere videri possint; et definitiones[2] (de quibus diximus) artibus præmissæ (secundum prudentiam Mathematicorum) vocabulorum pravas acceptiones corrigere valeant; attamen hæc omnia non sufficiunt, quo minus verborum præstigiæ et incantationes plurimis modis seducant, et vim quandam intellectui faciant, et impetum suum (more Tartarorum sagittationis) retro in intellectum (unde profecta sint) retorqueant. Quare altiore et novo quodam remedio ad hoc malum opus est. Verum hæc jam cursim perstringimus, interim *desiderari* pronunciantes hanc doctrinam, quam *Elenchos Magnos*, sive *de Idolis animi humani nativis et adventitiis*, appellabimus. Ejus autem tractationem legitimam ad Organum Novum referimus.

Superest Artis Judicandi Appendix quædam insignis; quam etiam *desiderari* statuimus. Siquidem Aristoteles rem notavit, modum rei nullibi persecutus est. Ea tractat, *quales demonstrationes ad quales materias sive subjecta applicari debeant;* ut hæc doctrina tanquam Judicationes Judicationum contineat. Optime enim Aristoteles *neque demonstrationes ab oratoribus, neque suasiones a mathematicis requiri debere* monet.[3] Ut si in probationis genere aberretur, judicatio ipsa non absolvatur. Quando vero sint quatuor demonstrationum genera, vel per *consensum immediatum et notiones communes;* vel per *Inductionem;* vel per *Syllogismum;* vel per eam (quam recte vocat Aristoteles) *Demonstrationem in Orbem*[4] (non a notioribus scilicet, sed tanquam de plano); habent hæ demonstrationes singulæ certa subjecta et materias scientiarum in quibus pollent, alia a quibus excluduntur. Etenim rigor et curiositas in poscendo probationes nimium severas in aliquibus, multo magis facilitas et remissio in acquiescendo probationibus levioribus in aliis, inter ea sunt numeranda quæ detrimenti plurimum et impedimenti scientiis attulerunt. Atque de Arte Judicandi hæc dicta sint.

[1] "Loquendum enim est ut plures, sentiendum ut pauci." — Niphus's *Commentary on Aristot. de Gen. et Corr.* lib. i. fo. 29. c.

[2] *Diffinitiones* in the original. — *J.S.*

[3] Arist. Metaph. ii. 3.

[4] Arist. Post. Analyt. ii. 13.

CAPUT V.

Partitio Artis Retinendi sive Retentivæ in Doctrinam de Adminiculis Memoriæ, *et Doctrinam de* Memoria ipsa. *Partitio Doctrinæ de Memoria ipsa in* Prænotionem, *et* Emblema.

Artem Retinendi, sive Custodiendi, in duas doctrinas partiemur; Doctrinam scilicet de Adminiculis Memoriæ, et Doctrinam de Memoria ipsa. Adminiculum Memoriæ plane *scriptio* est. Atque omnino monendum, quod Memoria sine hoc adminiculo rebus prolixioribus et accuratioribus impar sit; neque ullo modo nisi de scripto recipi debeat. Quod etiam in Philosophia Inductiva et Interpretatione Naturæ præcipue obtinet. Tam enim possit quis calculationes Ephemeridis memoria nuda absque scripto absolvere, quam interpretationi naturæ per meditationes et vires memoriæ nativas et nudas sufficere; nisi eidem memoriæ per *tabulas ordinatas* ministretur. Verum missa Interpretatione Naturæ, quæ doctrina nova est, etiam ad veteres et populares scientias haud quicquam fere utilius esse possit quam Memoriæ Adminiculum solidum et bonum; hoc est, *Digestum* probum et eruditum *Locorum Communium*. Neque tamen me fugit, quod relatio eorum quæ legimus aut discimus in Locos Communes damno eruditionis ab aliquibus imputetur, ut quæ lectionis cursum remoretur, et Memoriam ad feriandum invitet. Attamen quoniam adulterina res est in Scientiis præcocem esse et promptum, nisi etiam solidus sis et multipliciter instructus, diligentiam et laborem in Locis Communibus congerendis magni prorsus rem esse usus et firmitudinis in studiis judicamus; veluti quæ Inventioni copiam subministret, et aciem Judicii in unum contrahat. Verum est tamen inter methodos et syntaxes Locorum Communium quas nobis adhuc videre contigit, nullam reperiri quæ alicujus sit pretii; quandoquidem in titulis suis faciem prorsus exhibeant magis scholæ quam mundi; vulgares et pædagogicas adhibentes divisiones, non autem eas quæ ad rerum medullas et interiora quovis modo penetrent.

Circa Memoriam autem ipsam, satis segniter et languide videtur adhuc inquisitum. Extat certe de ea ars quæpiam; verum nobis constat tum meliora præcepta de Memoria confirmanda et amplianda haberi posse quam illa ars complectitur, tum practicam illius ipsius artis meliorem institui posse quam

quæ recepta est. Neque tamen ambigimus (si cui placet hac arte ad ostentationem abuti) quin possint præstari per eam nonnulla mirabilia et portentosa; sed nihilominus res quasi sterilis est (eo quo adhibetur modo) ad usus humanos. At illud interim ei non imputamus, quod *naturalem memoriam* destruat et super-oneret (ut vulgo objicitur); sed quod non dextre instituta sit ad auxilia memoriæ commodanda in negotiis et rebus seriis. Nos vero hoc habemus (fortasse ex genere vitæ nostro politicæ) ut quæ artem jactant, usum non præbent, parvi faciamus. Nam ingentem numerum nominum aut verborum semel recitatorum eodem ordine statim repetere; aut versus complures de quovis argumento extempore conficere; aut quidquid occurrit satirica aliqua similitudine perstringere; aut seria quæque in jocum vertere; aut contradictione et cavillatione quidvis eludere; et similia; (quorum in facultatibus animi haud exigua est copia, quæque ingenio et exercitatione ad miraculum usque extolli possunt;) hæc certe omnia et his similia nos non majoris facimus quam funambulorum et mimorum agilitates et ludicra. Etenim eadem ferme res sunt; cum hæc corporis, illa animi viribus abutantur; et admirationis forsitan aliquid habeant, dignitatis parum.[1]

Ars autem Memoriæ duplici nititur intentione; Prænotione, et Emblemate. Prænotionem vocamus abscissionem quandam investigationis infinitæ. Cum enim quis aliquid revocare in memoriam conatur; si nullam Prænotionem habeat aut perceptionem ejus quod quærit, quærit certe et molitur, et hac illac discurrit tanquam in infinito. Quod si certam aliquam Prænotionem habeat, statim abscinditur infinitum, et fit discursus Memoriæ magis in vicino, ut venatio damæ intra septa.[2] Itaque et ordo manifesto juvat Memoriam. Subest enim Prænotio, id quod quæritur tale esse debere ut conveniat cum ordine. Similiter carmina facilius discuntur memoriter quam prosa. Si enim hæretur in aliquo verbo, subest Prænotio, tale debere esse

[1] Of the art of memory Agrippa remarks: "Solent enim in gymnasiis plerunque hujus artis professione nebulones quidam scholaribus imponere ac rei novitate pecuniolam ab incautis emungere: turpe et impudentis est multarum rerum lectionem instar mercimoniorum ante fores explicare, cum interim vacua domus sit." — *De Incert. et Vanit. Scient.* c. 10.

The illustration at the end of this passage may have suggested that which Bacon employs in speaking of the method of Raymond Lully, vide infrà, p. 669.

In Selden's *Table-talk* he is made to affirm that, whatever may be said of great memories, no man will trust his memory when writing what is to be given to the world. [See *Table-talk*, under title "Minister Divine."]

[2] Compare Nov. Org. ii. 26.

verbum quod conveniat cum versu. Atque ista Prænotio est Artificialis Memoriæ pars prima. Nam in Artificiali Memoria *locos* habemus jam ante digestos et paratos; *imagines* extempore, prout res postulat, conficimus; at subest Prænotio, talem esse debere *imaginem*, qualis aliquatenus conveniat cum *loco;* id quod vellicat memoriam, et aliquo modo munit ad rem quam quærimus. Emblema vero deducit intellectuale ad sensibile: sensibile autem semper fortius percutit memoriam, atque in ea facilius imprimitur quam intellectuale; adeo ut etiam brutorum memoria per sensibile excitetur; per intellectuale minime. Itaque facilius retineas imaginem venatoris leporem persequentis, aut pharmacopœi pyxides ordinantis, aut pedantii orationem habentis, aut pueri versus memoriter recitantis, aut mimi in scena agentis, quam ipsas notiones inventionis, dispositionis, elocutionis, memoriæ, actionis. Sunt et alia quæ pertinent ad Memoriam juvandam (ut modo diximus); sed Ars quæ jam habetur ex his duobus jam præmissis consistit. Particulares autem artium defectus persequi, fuerit ab instituto nostro recedere. Igitur de Arte Retinendi sive Custodiæ, hæc dicta sint. Jam vero ad quartum membrum Logicæ, quod Traditionem et Elocutionem tractat, ordine pervenimus.

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LIBER SEXTUS.

AD REGEM SUUM.

CAPUT I.

Partitio Traditivæ in Doctrinam de Organo Sermonis, *Doctrinam de* Methodo Sermonis, *et Doctrinam de* Illustratione Sermonis. *Partitio Doctrinæ de Organo Sermonis in Doctrinam de* Notis Rerum, *de* Locutione, *et de* Scriptione; *quarum duæ posteriores* Grammaticam *constituunt, ejusque partitiones sunt. Partitio Doctrinæ de Notis Rerum in* Hieroglyphica, *et* Characteres Reales. *Partitio Secunda Grammaticæ in* Literariam, *et* Philosophantem. *Aggregatio* Poëseos quoad Metrum *ad Doctrinam de Locutione. Aggregatio* Doctrinæ de Ciphris *ad Doctrinam de Scriptione.*

Conceditur certe cuivis (Rex Optime) seipsum et sua ridere et ludere. Quis igitur novit, num forte opus istud nostrum non descriptum fuerit ex libro quodam veteri, reperto inter libros famosissimæ illius bibliothecæ Sancti Victoris; quorum catalogum excepit magister Franciscus Rabelesius?[1] Illic enim invenitur liber, cui titulus est *Formicarium Artium.* Nos sane pusillum acervum pulvisculi congessimus, et sub eo complura scientiarum et artium grana condidimus; quo formicæ reptare possint, et paulatim conquiescere, et subinde ad novos se labores accingere. At regum sapientissimus pigros quoscunque remittit ad formicas; nos autem pigros eos homines

[1] Pantag. ii. 7. The humour of making catalogues of imaginary books probably began with Rabelais.

pronunciamus, quibus acquisitis uti tantum cordi sit, neque subinde novas scientiarum sementes et messes facere.

Accedamus nunc ad Artem Tradendi, sive Proferendi et Enunciandi ea quæ inventa, judicata, ac in memoria reposita sunt; quam nomine generali *Traditivam* appellabimus. Ea omnes artes circa Verba et Sermones complectitur. Quamvis enim Ratio Sermonis veluti anima sit, tamen in tractando disjungi debent Ratio et Sermo; non minus quam Anima et Corpus. Traditivam in tres partes dividemus; Doctrinam circa *Organum Sermonis;* Doctrinam circa *Methodum Sermonis;* et Doctrinam circa *Sermonis Illustrationem sive Ornatum.*

Doctrina de Organo Sermonis vulgo recepta, quæ et Grammatica dicitur, duplex est; altera de Locutione, altera de Scriptione; recte enim Aristoteles; *Cogitationum tesseræ verba, verborum literæ.*[1] Utrunque Grammaticæ assignabimus. Verum ut rem altius repetamus, antequam ad Grammaticam et partes ejus jam dictas veniamus, in genere de Organo Traditivæ dicendum est. Videntur enim esse proles quædam Traditivæ aliæ, præter Verba et Literas. Hoc igitur plane statuendum est; quidquid scindi possit in differentias satis numerosas ad notionum varietatem explicandam (modo differentiæ illæ sensui perceptibiles sint) fieri posse vehiculum cogitationum de homine in hominem. Nam videmus nationes *linguis* discrepantes commercia non male per *gestus* exercere. At in practica nonnullorum, qui surdi et muti usque a nativitate fuerant et alias erant ingeniosi, miros vidimus haberi inter eos et amicos suos, qui eorum gestus perdidicerant, dialogos. Quinetiam notissimum fieri jam cœpit, quod in China et provinciis ultimi Orientis in usu hodie sint *characteres* quidam *reales,* non *nominales;* qui scilicet nec literas nec verba, sed res et notiones exprimunt.[2] Adeo ut gentes complures linguis prorsus discrepantes, sed hujusmodi characteribus (qui apud illos latius recepti sunt) consentientes, scriptis communicent; eousque ut librum aliquem, hujusmodi characteribus conscriptum, quæque gens patria lingua legere et reddere possit.[3]

[1] Arist. De Interpret. i. 1.

[2] In Acosta's *History of the New World* [book 6. c. 5.], which is a very interesting book, the writer, in giving an account of the way in which the Mexicans used hieroglyphical characters, makes a digression on the writing of the Chinese, in a manner which indicates that at that time their mode of writing was not generally known.

[3] This assertion was made by the early missionaries, and has been constantly repeated since. Within certain limits it is true; just as an Italian and an Englishman may read or write Latin equally well, though they pronounce it differently. But the

Notæ igitur Rerum, quæ absque ope aut medio Verborum res significant, duplicis generis sunt; quarum prius genus ex Congruo, alterum ad Placitum significat. Prioris generis sunt Hieroglyphica, et Gestus; posterioris vero ii, quos diximus, Characteres Reales. Hieroglyphicorum usus vetustus admodum et in veneratione quadam habitus, præcipue apud Ægyptios, gentem valde antiquam; adeo ut videantur Hieroglyphica fuisse Scriptio quædam ante-nata et senior ipsis Elementis Literarum, nisi forte apud Hebræos. Gestus autem tanquam Hieroglyphica transitoria sunt. Quemadmodum enim verba prolata volant, scripta manent; ita et Hieroglyphica gestibus expressa transeunt, depicta durant. Cum enim Periander, consultus de conservanda tyrannide, legatum astare juberet; atque ipse in horto deambulans summitates florum eminentiorum carperet, ad cædem [1] procerum innuens [2]; non

structure of the spoken languages, or rather dialects, to which written Chinese can correspond must be identical. It is difficult to attach a precise meaning to such statements as Remusat's "Les signes de leur écriture, pris en général, n'expriment pas des pronunciations, mais des idées." Every character has in truth, he immediately afterwards remarks, its sound; and a Chinese book can of course be read aloud in Chinese. Moreover the great majority of Chinese characters carry with them an indication of their pronunciation. They consist of two elements, one being a simpler character of the same sound, although generally speaking of totally different meaning, the other referring more or less precisely to the meaning. Thus the character for a particular kind of tree will contain, besides the phonetic element, the character for tree or wood in general; so too will very frequently that for a thing made of wood. These elements have been termed Phoneticæ and Classificæ. But most of the latter admit of being used in different combinations as Phoneticæ. They correspond precisely with the kind of hieroglyphics which Bunsen calls determinants, and are for the most part the same as the radicals (as they are called) used in arranging words in the Chinese dictionaries. The class of characters of which I have been speaking, is the fourth of the six classes into which Chinese characters are commonly divided. They are called Hiai-Ching, *id est* joined to sound, or Hing-Ching, *id est* representing the sound; and it is said that out of twenty-four thousand characters it was found that twenty-two thousand are of this kind. See Callery, *Systema phoneticum Scripturæ Sinicæ*, i. 9. He refers for his authority to a Chinese encyclopædia.

The view taken of the nature of these characters in Marshman's *Clavis Sinica*, is, as Remusat has pointed out, wholly wrong. It is much to be wished that a person sufficiently acquainted with the subject would investigate the analogy which exists between the Chinese and Egyptian modes of writing; not, of course, with any notion of establishing a historical connexion (as was once attempted) between the two nations. It is exceedingly remarkable, that as early as the fourth dynasty the Egyptians seem to have had a complete and even copious system of purely alphabetic characters, though, as Lepsius has shown, the majority of their alphabetic characters are of later date. I must apologise for the length of this note on a subject not very closely connected with the text.

[1] *Sedem* in the original. — *J. S.*

[2] Compare this with Solyman's lesson to his vizir on the art of sieges. "Come close to me," said the Sultan, "but on your head be it if you tread on the carpet on which I sit." The vizir reflected for a while, then gradually rolling up the carpet, advanced close to his instructor. "All is said," resumed Solyman; "you know now how strong places are to be taken." The lesson was given, it is said, in relation to the siege of Rhodes in 1521.

minus usus est Hieroglyphico, quam si id in charta depinxisset. Illud interim patet, Hieroglyphica et Gestus semper cum re significata aliquid similitudinis habere, et emblemata quædam esse ; unde eas *notas rerum ex congruo* nominavimus. At Characteres Reales nihil habent ex emblemate, sed plane surdi sunt ; non minus quam ipsa elementa literarum; et ad *placitum* tantum efficti, consuetudine autem tanquam pacto tacito recepti. Illud interim liquet, vasta ipsorum multitudine ad scribendum opus esse; tot enim esse debent, quot sunt vocabula radicalia. Hæc igitur portio Doctrinæ de Organo Sermonis quæ est de Notis Rerum, nobis ponitur pro Desiderato. Etsi autem tenuis possit videri esse ejus usus, cum verba et scriptio per literas sint organa Traditivæ longe commodissima ; visum est tamen nobis, veluti rei non ignobilis, aliquam hoc loco mentionem ejus facere. Tractamus enim hic veluti numismata rerum intellectualium ; nec abs re fuerit nosse, quod sicut nummi possint confici ex alia materia præter aurum et argentum, ita et Notæ Rerum aliæ possint cudi, præter Verba et Literas.

Pergamus igitur ad Grammaticam. Ea vero veluti viatoris locum erga cæteras scientias obtinet; non nobilem illum quidem, sed inprimis tamen necessarium; præsertim cum scientiæ nostris sæculis ex linguis eruditis, non vernaculis, potissimum hauriantur. Neque tamen dignitas ejus parva censenda est; quandoquidem antidoti cujusdam vicibus fungatur contra maledictionem illam confusionis linguarum. Sane hoc agit industria humana, ut se restituat et redintegret in benedictionibus illis quibus culpa sua excidit. Atque contra maledictionem primam generalem de sterilitate terræ et *comedendo panem suum in sudore vultus sui*, reliquis artibus omnibus se munit et instruit. At contra secundam illam de confusione linguarum, advocat in auxilium Grammaticam. Ejus in linguis quibusque vernaculis exiguus certe usus est; in externis perdiscendis latior; amplissimus vero in illis linguis quæ vulgares esse desierunt, et in libris tantum perpetuantur.

Grammaticam etiam bipartitam ponemus; ut alia sit Literaria, alia Philosophica. Altera adhibetur simpliciter ad linguas, nempe ut eas quis aut celerius perdiscat, aut emendatius et purius loquatur. Altera vero aliquatenus Philosophiæ ministrat. Qua in parte occurrit nobis Cæsarem libros *De Analogia* conscripsisse; atque dubitatio subiit utrum illi hanc, quam dicimus, Grammaticam Philosophicam tractarint. Suspi-

camur tamen nil admodum in illis fuisse subtilius aut sublimius; sed tantum præceptiones tradidisse de oratione casta et integra, neque a consuetudine loquendi prava neque ab affectatione aliquorum vitiata et polluta; in quo genere ipse excelluit.[1] Veruntamen hac ipsa re moniti, cogitatione complexi sumus Grammaticam quandam quæ non analogiam verborum ad invicem, sed analogiam inter verba et res, sive rationem, sedulo inquirat; citra tamen eam, quæ Logicæ subservit, hermeniam. Vestigia certe rationis verba sunt; itaque vestigia etiam aliquid de corpore indicant. Hujus igitur rei adumbrationem quandam tenuem dabimus. Primo autem minime probamus curiosam illam inquisitionem, quam tamen Plato vir eximius non contempsit[2]; nimirum de impositione et originali etymologia nominum; supponendo ac si illa jam a principio ad placitum indita minime fuissent, sed ratione quadam et significanter derivata et deducta; materiam certe elegantem, et quasi ceream, quæ apte fingi et flecti possit; quoniam vero antiquitatum penetralia perscrutari videtur, etiam quodammodo venerabilem; sed nihilominus parce veram, et fructu cassam. Illa demum, ut arbitramur, foret nobilissima Grammaticæ species, si quis in linguis plurimis tam eruditis quam vulgaribus eximie doctus, de variis *linguarum* proprietatibus tractaret; in quibus quæque excellat, in quibus deficiat, ostendens. Ita enim et linguæ mutuo commercio locupletari possint, et fiet ex iis quæ in singulis linguis pulchra sunt (tanquam Venus Apellis[3]) orationis ipsius quædam formosissima imago et exemplar quoddam insigne, ad sensus animi rite exprimendos. Atque una etiam hoc pacto capientur signa haud levia, sed observatu digna (quod fortasse quispiam non putaret) de ingeniis et moribus populorum et nationum, ex linguis ipsorum. Equidem libenter audio Ciceronem notantem, quod apud Græcos desit verbum, quod Latinum illud *ineptum* reddat; *Propterea*, inquit, *quod Græcis hoc vitium tam familiare fuit, ut illud in se ne agnoscerent quidem:* digna certe gravitate Romana censura.[4] Quid

[1] Aulus Gellius quotes from the *Analogia* of Cæsar, a precept to avoid an unusual word "veluti scopulum," *Noctes Att.* l. 10. Bacon refers to the *Analogia* in several other places. Vide suprà, p. [476. Observe that he there speaks of it as a *grammatical philosophy* in which Cæsar was endeavouring to bring words, which are the images of things, into congruity with the things themselves. Whence it would seem that he had changed his opinion as to the character of the book; for this would be the very *analogia inter verba et res* from which here he distinguishes it.]

[2] See particularly the *Cratylus*.

[3] Not the Venus of Apelles, but the Helen of Zeuxis.

[4] "Nam qui aut tempus quid postulet non videt, aut plura loquitur, aut se ostentat,

illud quod Græci in compositionibus verborum tanta licentia usi sunt, Romani contra magnam in hac re severitatem adhibuerunt? Plane colligat quis Græcos fuisse artibus, Romanos rebus gerendis, magis idoneos. Artium enim distinctiones verborum compositionem fere exigunt; at res et negotia simpliciora verba postulant. Quin Hebræi tantum compositiones illas refugiunt, ut malint metaphora abuti quam compositionem introducere. Quinetiam verbis tam paucis et minime commixtis utuntur, ut plane ex lingua ipsa quis perspiciat gentem fuisse illam Nazaræam, et a reliquis gentibus separatam. Annon et illud observatione dignum (licet nobis modernis spiritus nonnihil retundat) antiquas linguas plenas declinationum, casuum, conjugationum, temporum, et similium fuisse; modernas, his fere destitutas, plurima per præpositiones et verba auxiliaria segniter expedire? Sane facile quis conjiciat, utcunque nobis ipsi placemus, ingenia priorum sæculorum nostris fuisse multo acutiora et subtiliora.[1] Innumera sunt ejusmodi, quæ justum volumen complere possint. Non abs re igitur fuerit Grammaticam Philosophantem a Simplici et Literaria distinguere, et Desideratam ponere.

Ad Grammaticam etiam pertinere judicamus omnia illa quæ verbis quoquo modo accidunt, qualia sunt Sonus, Mensura, Accentus. At prima illa literarum simplicium cunabula (nempe qua percussione linguæ, qua apertura oris, qua adductione labiorum, quo nisu gutturis, singularum literarum sonus generetur) ad Grammaticam non pertinent, sed portio sunt Doctrinæ de Sonis, sub Sensu et Sensibili tractanda. Sonus, de quo loquimur, Grammaticus ad Euphonias tantum pertinet et Dysphonias. Illarum quædam communes sunt. Nulla enim est lingua, quin vocalium concurrentium hiatus aut consonantium concurrentium asperitates aliquatenus refugiat. Sunt et aliæ

aut eorum quibuscum est vel dignitatis vel commodi rationem non habet, aut denique in aliquo genere aut inconcinnus aut multus est, is ineptus dicitur. Hoc vitio cumulata est eruditissima illa Græcorum natio; itaque quod vim hujus mali Græci non vident, ne nomen quidem ei vitio imposuerunt, ut enim quæras omnia quomodo Græci ineptum appellent non reperies." — *Cic. De Orat.* ii. 4.

[1] On this very interesting question, which Bacon was probably the first to propose, Grimm has some good remarks in his essay on the origin of language, in the *Berlin Transactions* for 1852. He shows that of the two classes of languages here contrasted each has its own merits, observing that mere fulness of grammatical forms is not to be recognised as necessarily an advantage; else we should be obliged to rate Finnish, in which the noun has thirteen cases, above Sanscrit, in which it has eight, and Greek, in which it has only five. It may be remarked in illustration of this, that although there are in Sanscrit past tenses corresponding to the Greek aorists and perfects, yet the accuracy of logical discrimination which appropriates the latter to the completed action belongs to Greek only; so too of the appropriation of the imperfect to express an uncompleted action. See Bopp, *Comparative Grammar*, § 513.

respectivæ, quæ scilicet diversorum populorum auribus gratæ aut ingratæ accedunt. Græca lingua diphthongis scatet; Latina longe parcius. Lingua Hispanica literas tenues odit, easque statim vertit in medias.[1] Linguæ quæ ex Gothis fluxere aspiratis gaudent.[2] Multa sunt ejusmodi: verum hæc ipsa fortasse plus satis.

At Mensura Verborum ingens nobis corpus artis peperit, Poësim scilicet, non quatenus ad materiam (de qua supra) sed quatenus ad stilum et figuram verborum; versus nimirum sive carmina. Circa quæ ars habetur quasi pusilla, exempla accedunt grandia et infinita. Neque tamen ars illa (quam *Prosodiam* Grammatici appellant) ad carminum genera et mensuras edocendas tantum restringi debeat. Adjicienda enim sunt præcepta, quod carminum genus cuique materiæ sive subjecto optime conveniat. Antiqui heroïca carmina historiis et encomiis applicaverunt; elegos querimoniis; iambos invectivis; lyricos odis et hymnis. Neque hæc prudentia recentioribus poëtis in linguis propriis defuit. Illud reprehendendum, quod quidam antiquitatis nimium studiosi linguas modernas ad mensuras antiquas (heroïcas, elegiacas, sapphicas, &c.) traducere conati sunt[3]; quas ipsarum linguarum fabrica respuit, nec minus aures exhorrent. In hujusmodi rebus sensus judicium artis præceptis præponendum; ut ait ille,

Cœnæ fercula nostræ
Mallem convivis quam placuisse cocis.[4]

[1] This is somewhat overstated. The Spanish generally retains the Latin tenuis at the beginning of words and often in the middle. The tendency to the flattening Bacon mentions is most marked in the case of *p* and *b*. See Diez, *Grammatik der Romanischen Sprachen*, i. 252., for a general table of consonantal changes in the Roman tongues. A remarkable peculiarity in Spanish is the substitution of *h* (now dropped in pronunciation) for the Latin *f* at the beginning of words. It is not however universal, and belongs to a comparatively late period of the language, no trace of it being found, according to Diez, in the poem of the *Cid*.

[2] Bacon no doubt refers to High and Low German. The Gothic itself — commonly called Mœso-Gothic, but which might perhaps be as fitly called Italian-Gothic, as the existing remains of it belong probably to Italy in the time of Theodoric and his successors — is much less charged with aspirates than the tongues which claim descent from it. The last editor of Ulphilas, after pointing out the prevalence of liquids and tenues, observes rather fancifully: "Our ancestors were not a mountain people; they must have dwelt on plains under a moist, mild climate." The analogy of Gothic with Sanscrit is very striking. Bopp remarks: "When I read the venerable Ulphilas, I feel as if I were reading Sanscrit."

[3] This affectation prevailed about the same time in France and Italy, and a little later in England. Jodelle was the first person, according to Pasquier, who produced a French hexameter and pentameter.

Augustus von Schlegel, in his *Indische Bibliothek*, has an interesting essay on this subject, especially with respect to the Greek hexameter. He endeavours to determine the modifications necessary in order that it may be really naturalised in modern languages.

[4] Mart. ix. 83.

Neque vero ars est, sed artis abusus, cum illa naturam non perficiat sed pervertat. Verum quod ad Poësim attinet, (sive de fabulis sive de metro loquamur) est illa (ut superius diximus) tanquam herba luxurians, sine semine nata, ex vigore ipsius terræ germinans. Quare ubique serpit, et latissime diffusa est; ut supervacuum foret de defectibus ejus sollicitum esse. De illa igitur cura est abjicienda. Quod vero ad Accentus Verborum, nil opus est de re tam pusilla dicere; nisi forte illud quis notatu dignum putet, quod accentus Verborum exquisite, accentus autem Sententiarum neutiquam in observationem venit. Attamen illud fere universo generi humano commune est, ut vocem in fine periodi submittant, in interrogatione elevent, et alia hujusmodi non pauca. Atque de Grammaticæ parte, quæ ad Locutionem spectat, hactenus.

Quod ad Scriptionem attinet, ea aut Alphabeto Vulgari perficitur (quod ubique recipitur), aut Occulto et Privato, de quo inter singulos convenit; quod Ciphras vocant. At Orthographia Vulgaris etiam controversiam et quæstionem nobis peperit; utrum scilicet eodem verba scribere oporteat quo pronunciantur modo, an potius ex more consueto? At illa scriptio quæ reformata videri possit, (ut scilicet scriptio pronunciationi consona sit,) est ex genere inutilium subtilitatum. Nam et ipsa pronunciatio quotidie gliscit, nec constans est; et derivationes verborum, præsertim ex linguis extraneis, prorsus obscurantur. Denique cum ex more recepto scripta morem pronunciandi nullo modo impediant, sed liberam relinquant, quorsum attinet ista novatio[1]?

[1] Every living language is continually changing; and the orthography gradually follows changes of pronunciation. But to make the pronunciation of the present moment the standard of orthography is to set aside as far as possible the historical element in the development of the language, and thus greatly to diminish its value as a record of the progress of human thought, not to mention the effect which such a system would have in making works composed before the era of the last reformation unintelligible.

[I cannot help thinking that Bacon would have pronounced a less confident judgment on this question, if it had occurred to him that a system of notation might be contrived which should not only represent the pronunciation of the particular time, but *accompany all changes of pronunciation which time might introduce;* so that the written word should be *at all times* a true description of the spoken word. For this purpose, nothing more is required than an alphabet containing as many distinct *characters* as there are distinguishable elementary *sounds* in the language, so that the same sound may always be represented by the same character or combination of characters, and no combination of characters may be used to represent more than one combination of sounds. Against a reform of orthography founded upon such a reconstruction of the alphabet, it appears to me that none of the objections either in the text or in the note can be justly urged. With regard to the history of the past, everything would remain as it is. A dictionary containing the old and new spelling of every word in the language would effectually preserve its etymological history (so far as our present

Ad Ciphras igitur veniendum.[1] Earum genera haud pauca sunt: Ciphræ simplices; Ciphræ non-significantibus characteribus intermixtæ; Ciphræ duplices literas uno charactere complexæ; Ciphræ Rotæ; Ciphræ Clavis; Ciphræ Verborum; aliæ. Virtutes autem in Ciphris requirendæ tres sunt; ut sint expeditæ, non nimis operosæ ad scribendum; ut sint fidæ, et nullo modo pateant ad deciphrandum; addo denique, ut, si fieri possit, suspicione vacent. Si enim epistolæ in manus eorum devenient qui in eos qui scribunt, aut ad quos scribuntur, potestatem habeant, tametsi Ciphra ipsa fida sit et deciphratu

orthography does preserve it) up to the present time. For the future, pronunciation would still be free to change, and orthography would still follow; but the changes of pronunciation would be less rapid and capricious, and the corresponding changes of orthography would be not gradual but immediate. Pronunciation would change, not according to fashion or accident, but according to the laws of nature; and each change would be registered as it came in the printed records of the language. All this would surely be a great advantage, whether we regard language as a medium of communication, for which it serves best when it is most uniform and constant, or as a record of the progress of human thought, for which it serves the better in proportion as capricious and accidental changes are excluded and natural changes marked and registered.

Bacon was probably thinking of some particular scheme proposed in his own day, in which the existing alphabet was to be used. Many such partial schemes of orthographical reform have been attempted from time to time, all of which may be justly condemned as "useless subtilties," not because the thing aimed at — *ut scilicet scriptio pronunciationi consona sit* — would be useless if accomplished, but because, without such a reconstruction of the alphabet as should enable us to assign to each distinct sound a distinct character, the thing *cannot* be accomplished. With an alphabet of only twenty-six letters, it is impossible to make the spelling of English represent the pronunciation, because there are more than twenty-six distinct sounds used in English speech. It has recently been shown, however, that with an alphabet of only forty letters, every sound used in speaking good English may be represented accurately enough for all practical purposes; and a few more would probably include all the sounds of all the classical languages in Europe.

Two or three alphabets of this kind have been suggested within the last hundred years. There was one proposed by Benjamin Franklin, another by Dr. William Young, another by Sir John Herschell. But the first serious attempt to bring such an alphabet into general use, and fairly to meet and overcome all the practical as well as all the theoretical difficulties, was made by Mr. Alexander Ellis and Mr. Isaac Pitman in 1848. And there can be no doubt that by means of their alphabet every English word now in use may be so written that the spelling shall contain a sufficient direction for the pronunciation. Nor is there any reason to apprehend that it would ever be necessary to remodel it, since, however the fashion of pronunciation may change, it is not likely that any new elementary sounds will be developed; and therefore, though we might have to spell some of our words differently, we should still be able to spell them out of the same alphabet.

As for the fear that, if such a reformation were adopted, works composed previously would become unintelligible, it has been ascertained by many experiments that children who have learned to read books printed phonetically in the new alphabet easily teach themselves to read books printed in the ordinary way; and therefore, even if the new system should become universal for all new books, no one would have any difficulty in mastering the old ones. — *J. S.*]

[1] See, for an account of these ciphers, the appendix at the end of the volume. Bacon's biliteral cipher (see infrà, p. 659.) seems, as I have there pointed out, to be connected with one which had been given by Porta, which also depends on the principle of which the Electric Telegraph is now a familiar illustration, that any number of things may be denoted by combinations of two signs, as in the binary scale of numeration.

impossibilis, tamen subjicitur hæc res examini et quæstioni; nisi Ciphra sit ejusmodi, quæ aut suspicione vacet aut examinationem eludat. Quod vero ad elusionem examinis attinet, suppetit inventum ad hoc novum atque utile, quod cum in promptu habeamus, quorsum attinet illud inter Desiderata referre, sed potius id ipsum proponere? Hoc hujusmodi est; ut habeat quis duo alphabeta, unum literarum verarum, alterum non-significantium; et simul duas epistolas involvat, unam quæ secretum deferat, alteram qualem verisimile fuerit scribentem missurum fuisse, absque periculo tamen. Quod si quis de Ciphra severe interrogetur, porrigat ille alphabetum non-significantium pro veris literis, alphabetum autem verarum literarum pro non-significantibus. Hoc modo incidet examinator in epistolam illam exteriorem; quam cum probabilem inveniet, de interiori epistola nihil suspicabitur. Ut vero suspicio omnis absit, aliud inventum subjiciemus, quod certe cum adolescentuli essemus Parisiis excogitavimus; nec etiam adhuc visa nobis res digna est quæ pereat. Habet enim gradum Ciphræ altissimum; nimirum ut *omnia per omnia* significari possint; ita tamen, ut scriptio quæ involvitur quintuplo minor sit quam ea cui involvatur: alia nulla omnino requiritur conditio, aut restrictio. Id hoc modo fiet. Primo, universæ literæ alphabeti in duas tantummodo literas solvantur per transpositionem earum. Nam transpositio duarum literarum per locos quinque, differentiis triginta duabus, multo magis viginti quatuor (qui est numerus alphabeti apud nos) sufficiet.[1] Hujus alphabeti exemplum tale est.

Exemplum Alphabeti Biliterarii.[2]

A	*B*	*C*	*D*	*E*	*F*	*G*
Aaaaa.	*aaaab.*	*aaaba.*	*aaabb.*	*aabaa.*	*aabab.*	*aabba.*
H	*I*	*K*	*L*	*M*	*N*	*O*
aabbb.	*abaaa.*	*abaab.*	*ababa.*	*ababb.*	*abbaa.*	*abbab.*
P	*Q*	*R*	*S*	*T*	*V*	*W*
abbba.	*abbbb.*	*baaaa.*	*baaab.*	*baaba.*	*baabb.*	*babaa.*
X	*Y*	*Z.*				
babab.	*babba.*	*babbb.*				

[1] There is a simpler way of attaining the same end, viz. by using two sets of characters, the differences being, as in Bacon's method, intended to be imperceptible, and making the length of the intervals at which those of one set recur significant of the letters of the "interius scriptum." This is a system mentioned by writers on the subject; whether ever actually used, I do not know.

[2] For this and the following examples, a special character is used in the original edi

Neque leve quiddam obiter hoc modo perfectum est. Etenim ex hoc ipso patet modus, quo ad omnem loci distantiam, per objecta quæ vel visui vel auditui subjici possint, sensa animi proferre et significare liceat; si modo objecta illa, duplicis tantum differentiæ capacia sunt; veluti per campanas, per buccinas, per flammeos, per sonitus tormentorum, et alia quæcunque. Verum ut incœptum persequamur, cum ad scribendum accingeris, epistolam interiorem in Alphabetum hoc Biliterarium solves. Sit epistola interior;

Fuge.

Exemplum Solutionis.

F	*V*	*G*	*E.*
Aabab.	*baabb.*	*aabba.*	*aabaa.*

Præsto simul sit aliud Alphabetum Biforme; nimirum quod singulas Alphabeti Communis literas, tam capitales quam minores, duplici forma, prout cuique commodum sit, exhibeat.

Exemplum Alphabeti Biformis.[1]

a	*b*	*a*	*b*	*a*	*b*	*a*	*b*	*a*	*b*	*a*	*b*
A	*A*	*a*	*a*	*B*	*B*	*b*	*b*	*C*	*C*	*c*	*c*
D	*D*	*d*	*d*	*E*	*E*	*e*	*e*	*F*	*F*	*f*	*f*
G	*G*	*g*	*g*	*H*	*H*	*h*	*b*	*I*	*J*	*i*	*i*
K	*K*	*k*	*k*	*L*	*L*	*l*	*l*	*M*	*M*	*m*	*m*
N	*N*	*n*	*n*	*O*	*O*	*o*	*o*	*P*	*P*	*p*	*p*
Q	*Q*	*q*	*q*	*R*	*R*	*r*	*r*	*S*	*S*	*s*	*s*
T	*T*	*t*	*t*	*U*	*U*	*u*	*u*	*v*	*v*		
W	*W*	*w*	*w*	*X*	*X*	*x*	*x*	*Y*	*Y*	*y*	*y*
				Z	*Z*	*z*	*z*				

Tum demum epistolæ interiori, jam factæ biliteratæ, epistolam exteriorem biformem literatim accommodabis, et postea describes. Sit epistola exterior;

Manere te volo donec venero.

tion, resembling handwriting, and apparently cut in wood for the occasion. But as it is only in the *Alphabetum Biforme* and the *Exempla Accomodationis* that anything depends upon the shape of the letters, I have printed all the rest in the common italic type. — *J. S.*

[1] This biform alphabet is set out somewhat differently in the original edition. The characters are cut to represent handwriting, the distinctions being made by loops or flourishes; and the (*a*) or (*b*) is repeated in every case. By keeping the columns distinct, I have avoided the necessity of this repetition; and I have obtained the requisite distinction between the two sets of characters by using types belonging to two different founts. The particular forms of the letters are of course immaterial, so long as those which stand for *a* can be clearly distinguished from those which stand for *b*; and the table, as I have arranged it, will be found easier of reference. — *J. S.*

Exemplum Accommodationis.

F	*V*	*G*	*E.*
aabab.b	*aa*	*bb.aa*	*bba.aa*	*baa.*
Manere	*te*	*volo*	*donec*	*venero.*

Apposuimus etiam exemplum aliud largius ejusdem ciphræ, scribendi omnia per omnia.

Epistola interior; ad quam delegimus epistolam spartanam, missam olim in scytale.

Perditae res. Mindarus cecidit. Milites esuriunt. Neque hinc nos extricare, neque hic diutius manere possumus.

Epistola exterior, sumpta ex epistola prima Ciceronis; in qua epistola spartana involvitur.

Ego omni officio ac potius pietate erga te caeteris satisfacio omnibus: Mihi ipse nunquam satisfacio. Tanta est enim magnitudo tuorum erga me meritorum, ut quoniam tu, nisi perfecta re, de me non conquiêsti; ego, quia non idem in tua causa efficio, vitam mihi esse acerbam putem. In causa hæc sunt: Ammonius regis legatus aperte pecunia nos oppugnat: res agitur per eosdem creditores per quos cum tu aderas agebatur: regis causa si qui sunt qui velint, qui pauci sunt, omnes ad Pompeium rem deferri volunt: senatus religionis calumniam, non religione sed malevolentia, et illius regiae largitionis invidia comprobat, &c.

Doctrina autem de Ciphris aliam secum traxit doctrinam erga ipsam relativam. Illa est de Deciphratione, sive reseratione ciphrarum, licet quis alphabetum ciphræ aut pactum de latebra penitus ignoret. Res sane est illa laboriosa simul et ingeniosa, et arcanis principum, veluti et illa prior, dicata. Attamen præcautione solerti fieri possit inutilis; etsi quomodo res nunc se habent magni prorsus sit usus. Etenim si ciphræ introductæ essent bonæ et fideles, plurimæ fuerint quæ operam deciphratoris prorsus eluderent et excluderent; quæ tamen sint satis commodæ et expeditæ ad legendum aut scribendum. Verum imperitia et inscitia secretariorum et amanuensium in aulis principum tanta est, ut maxima plerunque negotia ciphris infirmis et futilibus committantur.

Interea fieri potest, ut suspicetur quispiam nos in enumeratione et quasi censu artium id agere, ut scientiarum copiæ (quas veluti in aciem adducimus) auctæ et multiplicatæ magis sint admirationi; cum tamen numerus earum forte ostentari, vires

tam brevi tractatu vix explicari possint. Verum nos institutum nostrum fideliter urgemus, atque in hoc globo scientiarum conficiendo etiam insulas minores aut remotiores omitti nolumus. Neque vero (ut arbitramur) perfunctorie, licet cursim, eas artes attingimus; sed potius nucleos et medullas ipsarum ex multa materiæ massa stilo acuto excerpimus. Cujus rei judicium ipsis illis qui in hujusmodi artibus peritissimi sunt permittimus. Cum enim plerique qui multiscii videri volunt hoc fere habeant, ut vocabula et exteriora artium passim jactantes, illarum ignaris admirationi, magistris ludibrio sint; speramus nostra contrarium prorsus eventum habitura, ut peritissimi cujusque in artibus singulis judicium maxime detineant, æteris minoris sint. Quod vero ad artes illas quæ minorum quasi gentium videri possunt, si quis existimet nos nimium quid ipsis tribuere, circumspiciat ille, et videbit homines in provinciis suis magnos sane et celebres, cum ad metropolim aut sedem imperii forte migraverint, turbæ fere immisceri, et inferioris notæ esse [1]: similiter mirum non est, artes istas leviores juxta artes principales et supremas collocatas dignitate minui; cum tamen iis qui operam illis præcipue impenderint, res videantur utique magnæ et præclaræ. Atque de Organo Sermonis hæc dicta sint.

CAPUT II.

Doctrina de Methodo Sermonis constituitur ut pars Traditivæ Substantiva et Principalis. Nomen ei inditur Prudentia Traditivæ. *Enumerantur Methodi genera diversa; et subjunguntur eorum commoda et incommoda.*

Veniamus ad Doctrinam de Methodo Sermonis. Ea ut pars dialecticæ tractari consuevit. Etiam locum in Rhetorica per nomen Dispositionis reperit. Verum collocatio ejus in famulitio aliarum artium in causa fuit, ut plurima quæ ad ipsam spectant cognitu utilia prætermissa sint. Visum igitur est nobis Doctrinam Substantivam et Principalem de Methodo constituere, quam nomine generali *Prudentiam Traditivæ* appellamus.

[1] Being then, as King James used to say, like ships at sea, and when at home like ships in a creek; a comparison which may possibly have been suggested by this passage, which occurs in the *Advancement* as well as here.

Itaque Methodi genera (cum varia sint) enumerabimus potius quam partiemur. Atque de unica Methodo, et dichotomiis perpetuis, nil attinet dicere.[1] Fuit enim nubecula quædam doctrinæ, quæ cito transiit; res certe simul et levis et scientiis damnosissima. Etenim hujusmodi homines, cum Methodi suæ legibus res torqueant et quæcunque in dichotomias illas non apte cadunt aut omittant aut præter naturam inflectant, hoc efficiunt ut quasi nuclei et grana scientiarum exiliant, ipsi aridas tantum et desertas siliquas stringant.[2] Itaque inania compendia parit hoc genus Methodi, solida Scientiarum destruit.

Constituatur igitur prima differentia Methodi, ut sit aut Magistralis, aut Initiativa. Neque vero verbum *Initiativæ* ita intelligimus, quasi hæc initia scientiarum tantum traderet, illa doctrinam integram; verum contra (vocabulum a Sacris mutuantes) eam dicimus Methodum Initiativam, quæ ipsa scientiarum mysteria recludat et denudet. Magistralis siquidem docet; Initiativa intimat. Magistralis poscit ut fides habeatur iis quæ dicuntur; Initiativa vero potius ut examen subeant. Altera scientias discentium vulgo; altera tanquam filiis scientiarum tradit. Denique altera pro fine habet scientiarum (quales jam sunt) usum; altera earundem continuationem et ulteriorem progressum. Harum posterior, via videtur deserta et interclusa. Ita enim adhuc scientiæ tradi consueverunt, quasi ex pacto tam docens quam discens errores asciscere cupiant. Etenim qui docet, eo docet modo quo maxime dictis suis fides astruatur, non quo illa commodissime examini subjiciantur; et qui discit, sibi extemplo satisfieri, non legitimam disquisitionem præstolari expetit; ut magis sit ei cordi *non dubitare* quam *non errare*. Ita ut et magister, amore gloriæ, infirmitatem scientiæ suæ prodere caveat; et discipulus, laboris odio, vires proprias experiri nolit. Scientia vero, quæ aliis tanquam tela pertexenda tradi-

[1] The allusion is to the method of Peter Ramus, which he made to apply to every kind of science, and which depends, as Bacon says, on a dichotomising arrangement. See, for Ramus's tabular statements of the contents of the seven liberal arts, the *Professio Regia P. Rami*. (Basil, 1576; but there is probably an earlier edition.)

[2] Ampère's Essay on the Philosophy of Science, though the work of a very able man, is certainly open to this reproach. His classification attempts to introduce uniformity where uniformity is impossible. The objections to a dichotomising method are pointed out by Aristotle, who shows that the last of the classes which we obtain by it can have only a negative character. Professor Owen, in his Lectures on the Invertebrata, remarks that no class thus constituted has been found satisfactory. Such a one for instance is that denoted by Dr. Prichard's word *Allophyl* for tribes not of Indo Germanic origin. See Trendelenburg, *Elementa Logices*, p. 129.

tur, *eadem Methodo* (si fieri possit) *animo alterius est insinuanda, qua primitus inventa est.* Atque hoc ipsum fieri sane potest in scientia per Inductionem acquisita; sed in anticipata ista et præmatura scientia (qua utimur), non facile dicat quis quo itinere ad eam quam nactus est scientiam pervenerit. Attamen sane secundum majus et minus possit quis scientiam propriam revisere, et vestigia suæ cognitionis simul et consensus remetiri; atque hoc pacto scientiam sic transplantare in animum alienum sicut crevit in suo. Artibus enim idem usuvenit quod plantis. Si planta aliqua uti in animo habeas, de radice quid fiat nil refert; si vero transferre cupias in aliud solum, tutius est radicibus uti quam surculis. Sic traditio (quæ nunc in usu est) exhibet plane tanquam truncos (pulchros illos quidem) scientiarum, sed tamen absque radicibus; fabro lignario certe commodos at plantatori inutiles. Quod si disciplinæ ut crescant tibi cordi sit, de truncis minus sis sollicitus; ad id curam adhibe, ut radices illæsæ, etiam cum aliquantulo terræ adhærentis, extrahantur. Cujus quidem generis traditionis Methodus mathematicorum, in eo subjecto, similitudinem quandam habet; generatim autem non video quod aut in usu sit, aut quod quis inquisitioni ejus dederit operam. Proinde eam inter Desiderata numerabimus, eamque *Traditionem Lampadis*, sive *Methodum ad Filios*, appellabimus.[1]

Sequitur aliud Methodi discrimen, priori intentione affine, reipsa fere contrarium. Hoc enim habet utraque Methodus commune, ut vulgus auditorum a selectis separet; illud oppositum, quod prior introducit modum tradendi solito apertiorem; altera, de qua jam dicemus, occultiorem. Sit igitur discrimen tale, ut altera Methodus sit Exoterica, altera Acroamatica. Etenim quam antiqui adhibuerunt præcipue in edendis libris differentiam, eam nos transferemus ad ipsum modum tradendi. Quinetiam Acroamatica ipsa apud veteres in usu fuit, atque prudenter et cum judicio adhibita. At Acroamaticum sive

[1] This illustrates the circumstance that several of Bacon's minor works are addressed as to a son or sons; by whom we are to understand those who are qualified to be disciples. In the *Redargutio Philosophiarum*, the speaker addresses his audience as "filii;" and we find a corresponding phrase in the *New Atlantis*.

[I understand by *filios* in this passage not so much those who are qualified to be disciples, as those who will carry on the work. The *traditio lampadis* refers to the Greek torch-races, in which there were relays of runners, and each as he was spent handed the torch to a fresh man. The *methodus ad filios* is the method which, having in view the continual progression of knowledge, hands over its unfinished work to another generation, to be taken up and carried forward. See preface to the *Novum Organum*, note B at the end. — *J. S.*]

Ænigmaticum istud dicendi genus posterioribus temporibus dehonestatum est a plurimis, qui eo tanquam lumine ambiguo et fallaci abusi sunt ad merces suas adulterinas extrudendas. Intentio autem ejus ea esse videtur, ut traditionis involucris vulgus (profanum scilicet) a secretis scientiarum summoveatur; atque illi tantum admittantur, qui aut per manus magistrorum parabolarum interpretationem nacti sunt, aut proprio ingenii acumine et subtilitate intra velum penetrare possint.

Sequitur aliud Methodi discrimen, magni prorsus ad scientias momenti; cum scilicet scientiæ traduntur aut per Aphorismos, aut Methodice. Notatu enim inprimis dignum est, in consuetudinem plerunque venisse ut homines ex pauculis axiomatibus et observationibus, in quovismodo subjecto, artem constituant quasi completam et solennem; eam ingenii quibusdam commentationibus suffarcinando, exemplis illustrando, et Methodo revinciendo. At illa altera Traditio per Aphorismos plurima secum fert commoda, ad quæ Traditio Methodica non attingit. Primum enim de scriptore specimen dat, utrum ille leviter et perfunctorie scientiam hauserit, an penitus imbiberit. Aphorismi enim, nisi prorsus forent ridiculi, necesse est ut ex medullis et interioribus scientiarum conficiantur. Abscinditur enim illustratio et excursio; abscinditur varietas exemplorum; abscinditur deductio et connexio; abscinditur descriptio practicæ; ut ad materiem Aphorismorum nihil relinquatur, præter copiam observationum bene amplam. Igitur ad Aphorismos non sufficiet quispiam, imo de eis nec cogitabit sane, qui se neutiquam copiose et solide instructum ad scribendum perspexerit. At in Methodis,

——— Tantum series juncturaque pollet,
Tantum de medio sumptis accedit honoris;[1]

ut speciem artis nescio cujus præclaræ sæpenumero reportent, ea quæ, si solvantur, segregentur, et denudentur, ad nihilum fere recasura forent. Secundo, Traditio Methodica ad fidem et consensum valet; ad indicationes de praxi minus innuit; siquidem demonstrationem quandam in orbe præ se fert, partibus se invicem illuminantibus, ideoque intellectui satisfacit magis; quia vero actiones in vita communi sparguntur, non ordine componuntur, ideo magis iisdem conducunt etiam sparsa documenta. Postremo Aphorismi, cum scientiarum portiones quasdam et quasi frusta tantum exhibeant, invitant ut alii

[1] Hor. Ep. ad Pisones, 242.

etiam aliquid adjiciant et erogent; Traditio vero Methodica, dum scientiam integram ostentat, securos illico homines reddit, quasi jam summa adeptos.

Sequitur aliud Methodi discrimen, magni et illud quoque momenti; cum scilicet scientiæ traduntur aut per Assertiones adjectis Probationibus, aut per Quæstiones una cum Determinationibus.[1] Hanc autem posteriorem Methodum si immoderatius quis persequatur, scientiarum profectui non minus illa officit, quam fortunis et progressibus exercitus cujuspiam impedimento et damno foret, si in minutis quibusque castellis aut oppidis expugnandis subinde hæreat. Etenim si quis in acie sit superior, et summæ belli sedulo incumbat, minora illa loca ultro se submittent. Illud tamen inficias non ierim, urbem aliquam magnam et munitam a tergo relinquere haudquaquam semper tutum esse. Eodem modo, confutationibus in scientiarum Traditione temperandum, iisque parce utendum; et ad hoc tantum, ut majores præoccupationes animorum et præjudicia frangantur; minime autem ut leviores dubitationes excitentur et provocentur.

Sequitur aliud Methodi discrimen, ut scilicet Methodus sit *subjectæ materiæ quæ tractatur accommoda.* Alio enim modo traduntur Mathematica (quæ sunt inter scientias maxime abstracta et simplicia); alio Politica (quæ maxime sunt immersa et composita). Neque (ut jam diximus) Methodus uniformis in materia multiformi commode se habere potest. Equidem quemadmodum Topicas Particulares ad inveniendum probavimus, ita et Methodos Particulares ad tradendum similiter aliquatenus adhiberi volumus.

Sequitur aliud Methodi discrimen, in tradendis scientiis cum judicio adhibendum. Illud autem regitur per informationes et anticipationes de scientia (quæ tradenda est) in animis discentium prius infusas et impressas. Aliter enim tradi debet scientia quæ ad animos hominum nova et peregrina prorsus accedit; aliter ea quæ opinionibus jampridem imbibitis et receptis est affinis et familiaris. Ideoque Aristoteles, Democritum sugillare cupiens, revera eum laudat; *Si* (inquit) *serio disputare velimus, non sectari similitudines,* etc.[2]; id vitio ver-

[1] The last is the Scholastic method. Vide supra, note 1. p. 454.

[2] ἐπιστήμη μὲν οὖν τί ἐστιν, ἐντεῦθεν φανερὸν, εἰ δεῖ ἀκριβολογεῖσθαι καὶ μὴ ἀκολουθεῖν ταῖς ὁμοιότησιν.—*Nicom. Ethic.* vi. 3. It is difficult to know why Bacon supposed Aristotle to allude to Democritus, as there is no reason to doubt the correctness of the

tens Democrito, quod in comparationibus esset nimius. At illi quorum documenta in opinionibus popularibus jam sedes suas collocarunt, non aliud habent quod agant, nisi ut disputent et probent. Illis contra quorum dogmata opiniones populares transcendunt, gemino labore opus est; primo ut intelligantur quæ afferunt, deinde ut probentur: ita ut necessum habeant confugere ad auxilia similitudinum et translationum, quo se captui hominum insinuent. Videmus igitur sub infantia doctrinarum sæculis rudioribus, cum syllepses illæ, quæ jam factæ sunt vulgares et tritæ, novæ fuerant et inauditæ, omnia parabolis et similitudinibus plena fuisse.[1] Alias evenisset, ut quæ proponebantur, aut absque nota seu attentione debita transmissa aut pro paradoxis rejecta fuissent. Etenim regula quædam est Traditivæ, *quod scientia omnis quæ anticipationibus sive præsuppositionibus non est consona, a similitudinibus et comparationibus suppetias petere debeat.*[2]

Atque de Methodorum diversis generibus hæc dicta sint; iis videlicet quæ antehac ab aliis notata non fuerunt. Nam quantum ad cæteras illas Methodos, Analyticam, Systaticam, Diæreticam, etiam Crypticam, Homericam[3], et similes, recte sunt eæ inventæ et distributæ; neque causa videtur, cur illis immoremur.

At Methodi Genera hujusmodi sunt, Partes autem duæ; altera de Dispositione totius Operis vel Argumenti libri alicujus; altera de Limitatione Propositionum. Etenim ad Architectu-

received opinion that the allusion is to Plato's illustration of the nature of knowledge which will be found at p. 197 of the *Theætetus*. On different occasions Aristotle blames those who in philosophical questions employ similitudes or comparisons; but it does not appear that in any such passage he refers to Democritus.

Mr. Munro, to whom I am indebted for the substance of this note, has pointed out to me the passage in Sextus Empiricus, *Adversus Logicos*, in which the opinion held by Democritus and others of the Physicists that "like is known of like" is mentioned. If any commentator has asserted that such a view of the nature of knowledge is condemned by Aristotle as would make it dependent upon this notion of ὁμοιότης, and that this notion was held by Democritus, we should get a probable explanation of the error into which Bacon seems to have fallen; but the simplest explanation is that he put the name of Democritus for that of Plato by mere inadvertence.

It may be remarked that Democritus might be charged not only with propounding a materialistic view of the nature of knowledge, but also with employing illustrations in support of it derived from material objects.

[1] "Mens hebes ad verum per materialia surgit,
Et demersa prius, hâc visâ luce resurgit."
SUGER, Abbot of St. Denis, in Didron, *Histoire de Dieu*, p. 9.

[2] Compare Plato, Politic. 277.: χαλεπὸν, μὴ παραδείγμασι χρώμενον, ἱκανῶς ἐνδείκνυσθαί τι τῶν μειζόνων.

[3] See, for most of these terms, the *Rhetoric* of Ramus.

ram spectat non solum fabrica totius ædificii, sed etiam efformatio et figura columnarum, trabium, et similium. Methodus vero veluti scientiarum Architectura est. Atque hac in parte melius meruit Ramus, in optimis illis regulis (*Καθόλου πρῶτον, κατὰ παντὸς, καθ' αὑτὸ*, &c.) renovandis[1], quam in unica sua Methodo et Dichotomiis obtrudendis. Veruntamen nescio quo fato fit, ut in humanis (sicut sæpius fingunt poëtæ) *rebus pretiosissimis semper adhibeantur perniciosissimi quique custodes.* Certe conatus Rami circa illam propositionum limam, conjecit eum in epitomas illas et scientiarum vada. Auspicato enim et fœlicis cujusdam genii ductu processerit oportet, qui axiomata scientiarum *convertibilia* facere attentaverit, et non simul ea reddiderit *circularia*, aut in semet recurrentia. Conatum nihilo secius Rami in hac parte utilem fuisse non inficiamur.

Supersunt duæ adhuc Propositionum Limitationes, præter eam ut fiant Convertibiles; altera de Extensione, altera de Productione ipsarum. Sane habent Scientiæ, si quis recte advertat, præter profunditatem, alias duas dimensiones; latitudinem scilicet, ac longitudinem suam. Ac profunditas quidem ad ipsarum veritatem et realitatem refertur; hæ enim sunt quæ soliditatem conferunt. Quantum ad reliquas duas, latitudo accipi et computari potest de scientia in scientiam; longitudo vero sumitur a summa propositione ad imam in eadem scientia. Altera fines et veros scientiarum terminos complectitur, ut propositiones proprie non promiscue tractentur, et evitetur repetitio, excursio, denique confusio omnis; altera normam præscribit, quousque et ad quem particularitatis gradum propositiones scientiarum sint deducendæ. Sane dubium non est, quin aliquid exercitationi et practicæ sit relinquendum; oportet siquidem Antonini Pii vitium evitari, ne simus *Cymini Sectores* in scientiis, neve divisiones ad infima quæque muliplicemus.[2] Itaque qualiter in hac parte nobis ipsi temperemus, inquisitione plane dignum est. Videmus enim nimium generalia (nisi deducantur) parum informare, quin potius hominum practicorum ludibrio scientias exponere; cum nihilo magis ad practicam faciant quam chorographia Ortelii universalis ad viam monstrandam quæ Londino ducit Eboracum. Certe regulæ optimæ

[1] These rules are in reality Ramus's own, though he professed to find them in Aristotle. They were however suggested to him by the fourth chapter of the first book of the *Posterior Analytics.* See the preface to *Valerius Terminus.*

[2] Vide supra, note 3. p. 472.

speculis ex metallo non inscite assimilantur[1], in quibus cernuntur utique imagines, sed non antequam expolita fuerint; sic juvant demum regulæ et præcepta, postquam exercitationis limam subierint. Quod si tamen usque a principio regulæ illæ fieri possint nitidæ et quasi crystallinæ, id optimum factu foret, quandoquidem exercitatione assidua minus indigebunt. Atque de Scientia Methodi (quam *Prudentiam Traditivæ* nominavimus) hæc dicta sint.

Neque tamen illud prætermittendum, quod nonnulli viri magis tumidi quam docti insudarunt circa Methodum quandam, legitimæ Methodi nomine haud dignam; cum potius sit Methodus imposturæ; quæ tamen quibusdam ardelionibus acceptissima proculdubio fuerit. Hæc Methodus ita scientiæ alicujus guttulas aspergit, ut quis sciolus specie nonnulla eruditionis ad ostentationem possit abuti. Talis fuit Ars Lullii; talis Typocosmia a nonnullis exarata; quæ nihil aliud fuerunt quam vocabulorum artis cujusque massa et acervus; ad hoc, ut qui voces artis habeant in promptu, etiam artes ipsas perdidicisse existimentur. Hujus generis collectanea officinam referunt veteramentariam, ubi præsegmina multa reperiuntur, sed nihil quod alicujus sit pretii.[2]

[1] *Assimulantur* in the original. — *J. S.*

[2] The fundamental idea of Lully's art, and of all similar methods, may be thus stated: — The propositions which in the aggregate make up the sum of human knowledge consist of combinations of a certain number of conceptions. If then we had a complete list of these conceptions so arranged as that all their admissible combinations could be obtained by a mechanical process, such a list would be virtually equivalent to a complete encyclopædia. Even an incomplete list would give a certain portion, greater or less according to circumstances, of all the knowledge which relates to the conceptions which enter into it. It is obvious that such a method can give no criterion of the truth of the propositions which it evolves; but it may be so managed as that every proposition shall be intelligible. To take a very simple instance: I confine myself to a table consisting of three columns, the first column to consist of names of quadrupeds, as horse, stag, mouse, &c.; the second of adjectives, such as large, small, rare, &c.; the third of names of classes of animals, as ruminant, rodent, and the like. With a few more such columns Lully would have said that the natural history of quadrupeds could be completely made out. Take any word from the first column, any word from the second, any word from the third, and connect them by the logical copula; and if you are fortunate, you obtain a result as reasonable as this — "a mouse is a small rodent." But of course it might have appeared that a horse was a ruminant.

Notwithstanding this obvious and incurable defect, different arrangements and modifications of the art were proposed by many writers, some of whom probably believed that it contained a key to all knowledge, while others believed that it would be at least useful as a means of arranging and suggesting to the mind all that could be said truly or falsely on a given subject. It appears to have suggested to Leibnitz one of his early tracts, that on the art of combination, and thus to have led him to his notion of reducing reasoning to a calculus. Analogous to Lully's art is a puerility which has recently been revived, namely, mechanical verse-making. It seems also to have suggested to Trithemius his method of secret writing, the fundamental idea of which may be explained by saying that if there were six and twenty animals in the first column of my table, the same number of adjectives in the second, and of classes in the third,

CAPUT III.

De Fundamentis, et Officio Rhetoricæ. Appendices tres Rhetoricæ, quæ ad Promptuariam tantummodo pertinent; Colores Boni et Mali, *tam Simplicis quam Comparati;* Antitheta Rerum; Formulæ minores Orationis.

Venimus jam ad Doctrinam de Illustratione Sermonis. Ea est, quæ Rhetorica dicitur, sive Oratoria: scientia certe et in se egregia, et egregie a scriptoribus exculta. Eloquentia autem, si quis vere rem æstimet, sapientia proculdubio est inferior. Videmus enim quanto intervallo hæc illam post se relinquat, in verbis quibus allocutus est Mosem Deus, cum ille munus sibi delatum propter defectum elocutionis recusasset; *Habes Aaronem, ille erit tibi vice oratoris, tu vero ei vice Dei.*[1] At fructu et populari existimatione, sapientia eloquentiæ cedit. Ita enim Salomon, *Sapiens corde appellabitur prudens, sed dulcis*

each column might represent a complete alphabet, and the proposition "a mouse is a small rodent" would stand for a word of three letters. With more columns longer words might be spelt, &c., &c. It is obvious that in this case the truth or falsehood of the propositions used would be of little or no moment.

Lully's art was, it is said, revealed to him by an angel, after he had taken the resolution of giving up the world and of devoting himself to studies for which his previous way of life had unfitted him. Cornelius Agrippa, who had himself written an exposition of it, thus condemns it in the *De Vanit. et Incert. Scient.* c. 9.: "Hoc autem admonere vos oportet, hanc artem ad pompam ingenii et doctrinæ ostentationem potius quam ad comparandam eruditionem valere, ac longe plus habere audaciæ quam efficaciæ." Though much cannot be said in favour of his method, yet Lully himself is one of the most remarkable persons of the middle ages. The story of his renouncing the world in consequence of the intense revulsion of feeling produced by the sudden extinction of a passionate love is well known; whether authentic or not, it is a striking illustration of the solemn words of Peter Damiani: "Quid ergo sit caro doceat ipsa caro." Lully says of himself: "I was married, I had begotten children, I was tolerably rich, I was wanton and worldly. All this with a willing mind did I forsake, that I might further God's glory and the public good, and exalt the holy faith; I learnt Arabic; many times went I forth to preach to the Saracens; for the faith's sake I was made prisoner and kept in bonds and beaten; forty and five years have I laboured to stir up the rulers of the Church and Christian princes to take heed to the public good; now am I old, now am I poor, yet in the same mind still, by God's help, will so continue to my life's end." Accordingly he went again to Africa, and, preaching the Gospel, was on the feast of St. Peter and St. Paul stoned and left half-dead. Some Genoese merchants put him on board their ship and there he died, and was buried in his native island of Majorca in 1315. See Antonio, *Bibl. Hisp. Vet.* vol. ii. p. 123. See, with respect to Lully in general, and particularly as to the charge of heterodoxy made against him, Perroquet, *Apologie de la Vie et des Ecritz du bien heureux Raymond Lully.*

The foolish story, still occasionally repeated, of Raymond Lully having made gold for Edward the Third, is sufficiently refuted by the date of his death, which occurred, according to authority which there is no reason to doubt, while Edward the Third was a child, and nearly thirty years before the coinage of the nobles said to have been made of Lully's gold. Camden is, I am afraid, responsible for the currency of the story, which in Selden's *Table Talk* seems to be transferred from Lully to Ripley.

[1] Exod. iv. 16.

eloquio majora reperiet[1]; haud obscure innuens sapientiam famam quandam et admirationem cuipiam conciliare, at in rebus gerendis et vita communi eloquentiam præcipue esse efficacem. Ad artis vero hujus culturam quod attinet; Aristotelis erga rhetores sui temporis æmulatio, atque Ciceronis studium acre et vehemens illi nobilitandæ totis viribus incumbens, cum longo usu conjunctum, in causa fuerunt ut in libris suis de hac arte conscriptis seipsos vicerint. Dein Exempla illa luculentissima hujusce artis, quæ in Orationibus Demosthenis et Ciceronis habentur, præceptorum acumini et diligentiæ addita, profectus ipsius geminarunt. Quare, quæ in hac arte *desiderari* invenimus versabuntur potius in Collectionibus quibusdam, quæ tanquam pedissequæ huic arti præsto sint, quam in disciplina et usu artis ipsius. Nam etiam tum cum Promptuariæ cujusdam inter Logica mentionem faceremus, uberiora ejus rei exempla in Rhetoricis polliciti sumus.

Veruntamen ut, more nostro, circa radices hujus artis glebam paululum aperiamus et subigamus; Rhetorica certe Phantasiæ, quemadmodum Dialectica Intellectui, subservit. Estque, si quis altius rem penetret, officium et munus Rhetoricæ non aliud quam ut *Rationis dictamina Phantasiæ applicet et commendet, ad excitandum appetitum et voluntatem.* Regimen enim rationis impeti et perturbari videmus tribus modis: vel per Illaqueationem Sophismatum, quod ad Dialecticam pertinet; vel per Præstigias Verborum, quod ad Rhetoricam; vel per Affectuum Violentiam, quod ad Ethicam. Quemadmodum enim in negotiis quæ cum aliis contrahimus vinci quis et perduci solet vel Astu, vel Importunitate, vel Vehementia; ita etiam in illa negotiatione interna quam nobiscum exercemus, aut Argumentorum Fallaciis subruimur, aut Impressionum et Observationum Assiduitate sollicitamur et inquietamur, aut Affectuum Impetu concutimur et rapimur. Neque vero tam infœliciter agitur cum natura humana, ut illæ artes et facultates ad rationem deturbandam valeant, neutiquam vero ad eandem roborandam et stabiliendam; verum ad hanc rem longe magis. Finis enim Dialecticæ est docere formam argumentorum, ad præsidia intellectus, non ad insidias. Finis itidem Ethicæ affectus ita componere, ut rationi militent, non autem eam invadant. Finis denique Rhetoricæ phantasiam implere obversationibus et simulachris, quæ rationi suppetias ferant, non

[1] Prov. xvi. 21.

autem eam opprimant. Abusus enim artis ex obliquo tantum interveniunt, ad cavendum, non ad utendum.

Quapropter in Platone summa fuit iniquitas (licet ex non immerito erga Rhetores sui temporis odio orta), cum Rhetoricam inter artes voluptarias collocavit; eam similem esse dicens Coquinariæ, quæ non minus cibos salubres corrumperet, quam insalubres gratiores redderet, condimentorum varietate et deliciis abutens.[1] Absit autem, ut oratio non frequentius versetur in rebus honestis ornandis, quam in turpibus oblinendis. Hoc enim ubique præsto est: siquidem nemo est quin honestius loquatur, quam aut sentiat aut faciat. Sane a Thucydide optime notatum est, tale quidpiam solitum fuisse objici Cleoni; quod cum semper deteriorem partem tueretur, in hoc multus esset, ut eloquentiam et sermonis gratiam carperet: probe quippe cum sciret, de rebus sordidis et indignis non posse quempiam pulchre loqui; at de rebus honestis facillime.[2] Eleganter enim Plato (licet jam in trivio decantetur) *Virtus si conspici daretur, ingentes sui amores concitaret*[3]; at Rhetorica virtutem et bonum depingit plane, et reddit quasi conspicuum. Cum enim in corporea effigie illa Sensui monstrari nequeant, superest ut per ornatum verborum Phantasiæ, repræsentatione quantum fieri potest viva, coram sistantur. Siquidem mos Stoicorum merito derisus est a Cicerone, qui concisis et argutis sententiis et conclusionibus virtutem animis hominum imponere satagebant, quæ res parvum habet cum phantasia et voluntate consensum.[4]

Porro, si affectus ipsi in ordinem compulsi et rationi prorsus morigeri essent, verum est nullum magnopere futurum persuasionum et insinuationum, quæ aditum ad mentem præbere possint, usum; sed satis fore si res ipsæ nude et simpliciter proponantur et probentur. Verum affectus, contra, tantas secessiones faciunt, quinetiam tantas turbas et seditiones movent, (secundum illud,

——— Video meliora proboque,
Deteriora sequor).[5]

[1] See the Gorgias, p. 462. et seq.

[2] See Diodotus's answer to Cleon, iii. 42.: *εὖ μὲν εἰπεῖν οὐκ ἂν ἡγεῖται περὶ τοῦ μὴ καλοῦ δύνασθαι, κ.τ.λ.*—*J. S.*

[3] See the Phædrus, p. 250.; and compare what Socrates relates in the *Symposium* of what he had heard from Diotime.

[4] Cicero De Fin. iv. cc. 18 and 19. The same remark occurs also in other parts of Cicero's works.

[5] Ovid, Metamorph. vii. 20. Bacon often quotes Ovid, but never I think by name.

ut ratio prorsus in servitutem et captivitatem abrepta foret, nisi eloquentiæ suada efficeret quo minus phantasia a partibus affectuum staret, sed potius opera ejus fœdus ineatur inter rationem et phantasiam contra affectus. Notandum est enim, affectus ipsos ad bonum apparens semper ferri, atque hac ex parte aliquid habere cum ratione commune; verum illud interest, quod *Affectus intuentur præcipue bonum in præsentia; Ratio prospiciens in longum, etiam futurum et in summa.* Ideoque cum quæ in præsentia obversentur impleant phantasiam fortius, succumbit plerunque ratio et subjugatur. Sed postquam eloquentia et suasionum vi effectum sit ut futura et remota constituantur et conspiciantur tanquam præsentia, tum demum, abeunte in partes rationis phantasia, ratio fit superior.

Concludamus igitur non deberi magis vitio verti Rhetoricæ, quod deteriorem partem cohonestare sciat, quam Dialecticæ, quod sophismata concinnare doceat. Quis enim nescit contrariorum eandem rationem esse, licet usu opponantur? Porro non eo tantum differt Dialectica a Rhetorica, quod (ut vulgo dicitur) altera instar pugni, altera instar palmæ sit, (altera scilicet presse, altera fuse tractet[1]); verum multo magis, quod Dialectica rationem in suis naturalibus, Rhetorica qualis in opinionibus vulgi sita est, consideret. Prudenter igitur Aristoteles Rhetoricam inter Dialecticam et Ethicam cum Politica collocat, cum ex utrisque participet.[2] Siquidem probationes et demonstrationes Dialecticæ universis hominibus sunt communes; at probationes et suasiones Rhetoricæ pro ratione auditorum variari debent; ut quis tanquam musicus, auribus diversis se accommodans, sit demum

Orpheus in silvis, inter delphinas Arion.[3]

Quæ quidem applicatio et variatio orationis (si quis ejus perfectionem et culmen desideret) eo usque extendi debet, ut si eadem ipsa apud diversos homines sint dicenda, apud singulos tamen aliis atque aliis verbis sit utendum. Quanquam hac parte Eloquentiæ (politica scilicet et negotiosa, in privatis sermonibus) maximos oratores plerunque destitui certum sit; dum ornatum et formulas elegantes orationis captantes, volubili illa applicatione et characteribus sermonum, quibus versus singulos uti consultius foret, excidunt. Certe non abs re fuerit

[1] See Cicero De Fin. ii. 17. by whom the remark is ascribed to Zeno.
[2] Arist. Rhet. i. 2.
[3] Virg. Ecl. viii. 56.

circa hoc ipsum, de quo nunc dicimus, novam instituere inquisitionem, eamque nomine Prudentiæ Sermonis Privati indigitare, atque inter Desiderata reponere; rem certe quam quo attentius quis recogitet, eo pluris faciet. Utrum vero hæc inter Rhetorica an Politica collocetur, haud magni refert.

Descendamus modo ad Desiderata in hac arte, quæ (ut ante diximus) ejus sunt generis, ut pro Appendicibus potius censeri debeant quam pro portionibus artis ipsius; et pertinent omnia ad Promptuariam. Primo igitur non invenimus, qui prudentiam illam simul et diligentiam Aristotelis bene persecutus sit aut suppleverit. Hic nimirum cœpit colligere *Signa Popularia* sive *Colores Boni ac Mali Apparentis*, tam simplicis quam comparati, qui sunt vere Sophismata Rhetorica. Sunt autem eximii usus, præsertim ad negotia et prudentiam Sermonis Privati. Labores vero Aristotelis[1] circa colores istos in tribus claudicant: primo, quod, cum multi sint, paucos admodum recenseat; secundo, quod Elenchos suos non habeant adjunctos; tertio, quod videtur ille usum eorum ex parte ignorasse. Usus enim eorum non magis ad probandum quam ad afficiendum et commovendum subservit. Complures siquidem loquendi formulæ, quæ idem significant, varie tamen afficiunt. Nam longe fortius penetrat quod acuminatum est, quam quod obtusum; licet in ipsa percussione vires æqualiter intendantur. Nemo est certe, qui non magis afficiatur, audiens *inimici tui de hoc miros triumphos agent*,

Hoc Ithacus velit, et magno mercentur Atridæ;[2]

quam si simpliciter dicatur, *Hoc rebus tuis incommodabit.* Itaque mucrones isti et aculei sermonum minime sunt negligendi. Cum vero hanc rem ut Desideratam proponamus, ex consuetudine nostra illam Exemplis fulciemus. Præcepta enim minus rem illustraverint.

Exempla *Colorum Boni et Mali, tam Simplicis quam Comparati.*

Sophisma.

1. *Quod laudant homines et celebrant, bonum; quod vituperant et reprehendunt, malum.*

[1] See the first book of the *Rhetoric*, chapters 6 and 7. The first, second, third, and sixth of the Sophismata which Bacon goes on to give are found there.

[2] Virg. Æn. ii. 104. See for the remark here made, Aristotle ubi suprà. He notes the expression in the Iliad which corresponds to Bacon's quotation, Il. i. 255.

ELENCHUS.

Fallit Sophisma quatuor modis; scilicet, aut propter Ignorantiam; aut propter Malam Fidem; aut propter Studia et Factiones; aut propter Ingenia Laudatorum et Vituperatorum. Propter Ignorantiam; quid vulgi judicium ad examen boni et mali? Melius Phocion, qui cum populus ei præter solitum applauderet, quæsivit; *Num forte deliquisset?*[1] Propter Malam Fidem; laudantes enim et vituperantes suam rem sæpius agunt, neque loquuntur ut sentiunt:

Laudat venales qui vult extrudere merces.[2]

Item, *Malum est, malum est* (*inquit emptor*), *sed cum recesserit, tum gloriabitur.*[3] Propter Factiones; cuivis enim patet, consuescere homines, eos qui suarum partium sunt immodicis efferre laudibus; qui autem contrariarum sunt, infra meritum deprimere. Propter Ingenia; alii enim natura facti sunt et compositi ad adulationem servilem, alii contra Momi et tetrici; ut laudando et vituperando suis Ingeniis tantum obsecundent, parum de veritate solliciti.

SOPHISMA.

2. *Quod etiam ab inimicis laudatur, magnum bonum; quod vero etiam ab amicis reprehenditur, magnum malum.*

Sophisma fundamento hoc niti videtur; quod quæ ingratiis et contra animi nostri affectum et propensionem loquimur, ea ipsa vim veritatis a nobis extorquere facile creditur.

ELENCHUS.

Fallit Sophisma propter Astutiam, tam Inimicorum quam Amicorum. Inimici enim laudes quandoque tribuunt, non invite, nec a vi veritatis coacti; sed eas tamen deligentes, quæ inimicis suis invidiam et pericula conflare possint. Itaque apud Græcos superstitio quædam invaluit, ut crederent, si quis ab altero laudaretur animo malevolo et proposito nocendi, *naribus ejus pustulam annasci solere.* Fallit iterum, quia laudes interdum impertiunt inimici, tanquam præfatiunculas quasdam, ut postea liberius et maliciosius calumniarentur. Ex altera parte, fallit etiam hoc sophisma propter astutiam Amicorum. Solent enim et illi vitia amicorum interdum agnoscere et prædicare, non quod aliqua vis veritatis eos cogat, sed ea eligentes quæ minimum amicos suos lædere possint; ac si cætera

[1] Plutarch, in Phocion, c. 8. [2] Horace, Ep. ii. 2. 11. [3] Prov. xx. 14.

quidem viri optimi essent. Fallit iterum, quia Amici quoque reprehensionibus suis (sicut de Inimici laudibus diximus) tanquam præfatiunculis quibusdam utuntur, quo paulo post in laudes effusius excurrant.

SOPHISMA.

3. *Cujus privatio bona, id ipsum malum ; cujus privatio mala, id ipsum bonum.*

ELENCHUS.

Fallit Sophisma duobus modis ; aut propter Comparationem Boni et Mali ; aut propter Successionem Boni ad Bonum, aut Mali ad Malum. Propter Comparationem ; si bonum fuerit generi humano privari esu glandium, non sequitur quod malus ille erat ; sed Dodona bona, Ceres melior.[1] Neque, si malum fuit populo Syracusano Dionysio seniore privari, sequitur quod Dionysius ille bonus fuerit, sed minus malus quam junior. Per Successionem ; etenim privatio boni alicujus non semper dat locum malo, sed quandoque majori bono ; ut cum flos decidit, fructus succedit ; nec privatio alicujus mali dat semper locum bono, sed interdum majori malo. Nam sublato inimico Clodio, Milo simul et segetem gloriæ perdidit.[2]

SOPHISMA.

4. *Quod bono aut malo vicinum est, id ipsum itidem bonum aut malum : quod vero remotum est a bono, malum ; quod a malo, bonum.*

Habet hoc fere rerum natura, ut quæ natura sua conveniant, etiam locis conveniant ; quæ vero contrariæ naturæ sunt, etiam intervallis distent ; cum singula amica sibi associare, inimica summovere gaudeant.

ELENCHUS.

Sed fallit Sophisma tribus modis ; primo propter Destitutionem ; secundo propter Obscurationem ; tertio propter Protectionem. Propter Destitutionem ; fit ut quæ in suo genere amplissima sunt et maxime excellunt, omnia quantum fieri potest ad se trahant, et in vicino quæque posita destituant ac quasi inedia conficiant. Itaque in propinquo arborum grandium

[1] The allusion is to the following lines : —

" Prima Ceres ferro mortales vertere terram
Instituit, cum jam glandes atque arbuta sacræ
Deficerent silvæ, et victum Dodona negaret." VIRG. *Georg.* i. 147.

[2] " Quid enim odisset Clodium Milo, segetem ac materiam suæ gloriæ ? "— *Cic. Pro Mi.* 36.

virgulta nunquam læta reperies. Recte etiam ille, *Divitis servi maxime servi.* Nec male cavillatus est qui inferius famulitium in aulis principum *festorum vigiliis* comparavit; quæ festa sua in proximo attingunt, ipsæ autem jejuniis addicuntur.[1] Propter Obscurationem; etenim et hoc habent quæque in suo genere præstantissima, ut licet proxima non extenuent aut destituant, tamen obscurent et obumbrent; quod etiam de Sole notant astronomi; quod sit scilicet aspectu bonus, conjunctione et approximatu malus. Propter Protectionem; nam non solum res coëunt et congregantur propter consortium et naturæ similitudinem, sed etiam malum (præsertim in civilibus) confugit ad bonum, ut lateat et protegatur. Itaque scelerati homines petunt asyla Divorum, et vitium ipsum se in virtutis umbram recipit:

Sæpe latet vitium proximitate boni.[2]

Contra, et bonum se aggregat ad malum, non propter consortium, sed ut illud convertat et reformet in bonum. Itaque et medici magis accedunt ad ægrotos quam ad sanos, et Servatori nostro objectum est, quod *conversaretur cum publicanis et peccatoribus.*

SOPHISMA.

5. *Cui cæteræ partes vel sectæ secundas unanimiter deferunt* (*cum singulæ principatum sibi vendicent*) *melior reliquis videtur: nam primas quæque ex zelo videtur sumere, secundas autem ex vero et merito tribuere.*

Ita Cicero argumentatur sectam Academicorum, quæ acatalepsiam tenuit, philosophiarum fuisse præstantissimam. *Interroga enim* (inquit) *Stoïcum, quæ secta sit potior; ille suam cæteris anteponet: deinde quæ secundas teneat; Academicam fatebitur. Age similiter cum Epicureo* (*qui Stoici vix aspectum toleraverit*), *postquam suam sectam collocarit in summo, collocabit Academicam in proximo.*[3] Similiter, vacante dignitate aliqua, princeps si competitores singulos interrogaret quem post se potissimum commendare vellent, verisimile est secunda illorum vota in eum qui præcipue dignus et optime meritus fuerit concursura.

ELENCHUS.

Fallit Sophisma propter Invidiam. Solent enim homines,

[1] Namely Henry Noel. See the Apophthegms.

[2] "Et lateat vitium proximitate boni." OVID. *Ars Amand.* ii. 662.

[3] The passage of Cicero here referred to is a fragment of the *Academ. ad Varr.* preserved by St. Augustine.

proxime post se et factionem suam, in eos inclinare et propendere qui reliquorum maxime sint enerves et imbelles, quique eis minimum molestiæ exhibuerunt; in odium illorum qui illis plurimum insultarunt aut incommodarunt.

SOPHISMA.

6. *Cujus excellentia vel exuperantia melior, id toto genere melius.*

Huc pertinent Formulæ illæ usitatæ: *Ne pervagemur in generalibus. Conferamus particularem aliquem cum particulari,* &c.

ELENCHUS.

Videtur hoc Sophisma satis nervosum, et magis Dialecticum quiddam quam Rhetoricum. Attamen interdum fallit. Primo quia sunt res haud paucæ, periculo plurimum obnoxiæ, quæ tamen si evadant cæteris antecellant; ita ut genere sint deteriores, quia sæpius periclitantur et excidunt; individuo autem nobiliores. In hoc numero est Gemma Martia, de qua Gallicum adagium; *Filius Parisiorum et Gemma mensis Martii, si ex illis evadat unus, erit instar decem aliorum.*[2] Adeo ut in genere gemma Maii gemmæ Martii præstet; sed tamen in individuo optima gemma Martii optimæ gemmæ Maii præferatur. Fallit secundo, propter *naturam rerum in aliquibus generibus aut speciebus magis æqualem, in aliquibus magis inæqualem;* quemadmodum in observationem venit climata calidiora generaliter ingenia producere acutiora; at in frigidioribus ingenia illa quæ eminent etiam acutissimis calidarum regionum præstare. Similiter, in exercitibus compluribus, si res duello inter singulos transigeretur, fortasse ad unam partem accederet victoria; si copiis universis, in alteram. Etenim excellentiæ et exuperantiæ casum recipiunt; at genera natura aut disciplina reguntur. Quinetiam, in genere, metallum lapide pretiosius; attamen adamas præcellit auro.

SOPHISMA.

7. *Quod rem integram servat, bonum; quod sine receptu est, malum. Nam se recipere non posse, impotentiæ genus est; potentia autem bonum.*

Hinc confinxit Æsopus fabulam de duabus ranis, quæ in magna siccitate, cum aquæ ubique deficerent, deliberarunt quid

[1] In the *Colours of Good and Evil*, this adage is given in French:—

"Bourgeon de Mars, enfans de Paris,
Si un eschape, il en vaut dix."

sibi demum agendum esset. Prior autem; *Descendamus* (inquit) *in puteum profundum, neque enim verisimile est ibi aquam defuturam.* Cui altera ita regerit; *Quin si forte ibi quoque aqua deficiet, quomodo exinde rursus ascendere poterimus?* Firmamentum autem hujus Sophismatis est, quod actiones humanæ adeo sint incertæ et periculis expositæ, ut illud optimum videatur quod plurima habeat effugia. Huc spectant formulæ illæ, quæ in usu sunt; *Obligatum plane et obstrictum te reddes: Non tantum quantum voles sumes ex fortuna,* &c.

ELENCHUS.

Fallit Sophisma primo, quia in actionibus humanis fortuna urget ut aliquid demum decernatur. Etenim, ut eleganter a quopiam dictum est, *etiam non statuere est aliquid statuere;* adeo ut sæpenumero consilii suspensio pluribus nos implicet necessitatibus quam si aliquid statuissemus. Videtur autem iste morbus quidam animi similis ei qui reperitur in avaris; sed translatus a cupiditate retinendi opes ad cupiditatem retinendi arbitrium et potestatem. Siquidem avarus frui non vult, ne quid detrahat de summa; ita et hujusmodi scepticus nil exequi vult, ut omnia ei sint integra. Fallit secundo, quia necessitas, et illud (quod aiunt) *Jacta est alea,* stimulos addit animis; sicut inquit ille, *Cæteris pares, necessitate certe superiores estis.*[1]

SOPHISMA.

8. *Quod quis culpa sua contraxit, majus malum; quod ab externis imponitur, minus malum.*

Hujus rei causa est, quod morsus conscientiæ adversa conduplicet; contra, conscium sibi esse quod culpa quis vacet, magnum præbet in calamitate solatium. Itaque poëtæ ea pathemata maxime exaggerant, tanquam desperationi propiora, ubi quis seipsum accuset et discruciet;

Seque unum clamat causamque caputque malorum.[2]

Contra, calamitates virorum insignium elevat et diluit innocentiæ et meriti conscientia. Porro cum malum ab aliis intentetur, habet quivis quod libere conqueri possit; unde dolores sui exhalent neque cor suffocent. Etenim iis quæ ab injuria hominum profecta sunt, indignari solemus, aut ultionem meditari, aut denique Nemesim divinam vel implorare vel ex-

[1] "Virtute pares, necessitate superiores estis."—*Livy,* iv. 28.

[2] "Se causam clamat crimenque caputque malorum." VIRG. *Æn.* xii. 600.

pectare; quinetiam, si a Fortuna ipsa inflictum quid sit, tamen datur quædam cum Fatis ipsis expostulatio;

Atque Deos atque astra vocat crudelia mater.[1]

Contra, ubi quis malum aliquod sua culpa contraxerit, stimuli doloris intro vertuntur, animumque magis vulnerant et confodiunt.

ELENCHUS.

Fallit istud Sophisma, primo propter Spem; quæ malorum magnum est antidotum. Etenim culpæ emendatio sæpe in nostra potestate sita est; fortunæ vero minime. Itaque Demosthenes non semel cives suos hujusmodi verbis affatus est; *Quod ad præterita pessimum, id ad futura optimum est. Quid hoc tandem sit? Hoc ipsum scilicet, quod vestra incuria et culpa res vestræ male se habeant. Nam si vos officio vestro per omnia perfuncti essetis, et nihilominus status vester, ut nunc, laborasset, ne spes quidem reliqua esset eum futurum aliquando meliorem. Cum vero errores vestri in causa potissimum fuerint, confidendum plane vos illis emendatis pristinum statum vestrum recuperaturos.* Similiter Epictetus, de gradibus tranquillitatis animi verba faciens, infimum locum illis attribuit *qui alios accusant*, superiorem iis *qui seipsos*, supremum vero illis *qui nec alios nec seipsos.*[3] Fallit secundo, propter insitam animis humanis Superbiam; qua ægre adducuntur homines ut errores proprios agnoscant. Hoc vero ut evitent, patientiam adhibent longe majorem in iis malis quæ culpa sua contraxerunt. Etenim, quemadmodum fieri videmus, ut cum culpa admissa sit, neque de authore constiterit, supra modum excandescunt homines et tumultuantur; quod si postea in notitiam pervenerit culpam illam ad filium aut uxorem aut gratiosum aliquem pertinere, statim sedantur turbæ et consilescunt; eodem modo fit, cum res aliqua accidit propter quam necessitas incumbit culpam in nos ipsos recipiendi. Id quod in mulieribus sæpissime conspicitur, quæ si quid infœliciter egerunt contra consensum parentum aut amicorum, qualecunque infortunium sequatur, illud sedulo dissimulabunt.[4]

SOPHISMA.

9. *Gradus privationis major videtur quam gradus diminu-*

[1] Virg. Eclog. v. 23.
[2] See the first and the third Philippic for passages to this effect.
[3] Enchirid. c. 5. [4] Bacon makes the same remark in the Essay on Marriage.

tionis; et rursus, gradus incœptionis major videtur quam gradus incrementi.

Canon est in Mathematicis *nullas esse rationes nihili ad aliquid.* Itaque gradus nullitatis et quidditatis majores videntur gradibus incrementi et decrementi. Sicut monoculo durius est unum perdere oculum, quam utrunque oculum habenti. Similiter, complures liberos habenti gravius est ultimum qui superstes fuerit filium amittere, quam reliquos priores. Itaque et Sibylla cum duos priores libros combussisset, pretium tertii duplicavit; siquidem illius amissio gradus fuisset Privationis, non Diminutionis.

ELENCHUS.

Fallit Sophisma primo, propter eas res quarum usus in sufficientia quadam sive competentia, hoc est, quantitate determinata, consistit. Si quis enim obligetur pœnaliter ad solutionem certæ pecuniæ summæ ad diem certum, gravius ei fuerit nummo unico aureo carere, quam si, posito quod ille unicus parari non potuerit, deessent etiam decem alii. Similiter in decoctionibus fortunarum, damnosior videtur gradus obærationis qui primus sortem minuit, quam extremus, qui ad egestatem redigit. Huc spectant formulæ illæ usitatæ; *Sera in fundo parsimonia:*[1] *Parum interest utrum nihil habeas, an quod nihil juvet,* etc. Fallit secundo, propter illud principium in natura, quod *corruptio unius sit generatio alterius.*[2] Adeo ut gradus ipse Privationis ultimæ minus interdum incommodet, quoniam ansam et stimulum præbet novæ alicui rationi ineundæ. Unde etiam Demosthenes sæpius conqueritur apud cives suos; *Conditiones minus utiles et honorificas, quas a Philippo impositas subibant, nihil aliud esse quam alimenta quædam ipsorum ignaviæ et socordiæ; ut multo iis fuisset satius illis omnino carere, propterea quod hoc pacto industria illorum melius acui possit ad alia paranda remedia.*[3] Novimus certe medicum quendam qui mulieribus

[1] This sentence occurs in the first of Seneca's epistles, and is given as a proverb by Erasmus. See his *Adagia*, ii. 2. 64. Seneca probably took it from Hesiod, δειλὴ δ' ἐνὶ πυθμένι φειδώ, *Op. et Dies*, v. 339.; and the right reading is perhaps misera, not sera.

[2] Arist. De Gen. et Corr. i. 4.

[3] Wats refers to the first Philippic, towards the end of which there is a passage not unlike that in the text; but the phrase "alimenta socordiæ," which Bacon has quoted in several parts of his works, is not to be found there. He derived it from H. Wolf's translation of a passage in the third Olynthiac, c. 33., where the Greek is simply ἔστι ταῦτα τὰ τὴν ἑκάστου ῥᾳθυμίαν ὑμῶν ἐπαυξάνοντα, which Wolf renders by "alimenta sunt vestrûm omnium socordiæ." There is no reference to Philip's conduct in the immediate context, the "alimenta socordiæ" being in reality matters of internal arrangement. It seems as if Bacon read the oration in Wolf's version, and adopted

delicatis querentibus se male habere sed tamen a medicamentis omnibus abhorrere, solebat dicere, non minus facete quam morose, *Vobis omnino opus est ut deterius valeatis, quo medicamenta etiam quælibet libenter toleretis.* Quinetiam ipse gradus Privationis sive indigentiæ ultimæ salutaris esse possit, non tantum ad excitandam industriam, verum etiam ad imperandam patientiam.

Quod ad secundum membrum hujus Sophismatis, illud eodem quo prius fundamento (de gradibus quidditatis et nullitatis) nititur. Hinc tanta usurpantur de initiis negotiorum præconia;

Dimidium facti, qui bene cœpit, habet, &c.[1]

Hinc Astrologorum superstitio, qui judicium faciunt de dispositione aut fortuna hominis ex momento sive articulo nativitatis aut conceptus.

Elenchus.

Fallit Sophisma primo, quoniam in nonnullis primæ rerum incœptiones nihil aliud sunt quam quæ Epicurus in philosophia sua appellat Tentamenta[2]; id est, rudimenta quædam, quæ nihili sunt nisi iterentur aut provehantur. Itaque in hoc casu gradus secundus dignior videtur et potentior quam primus. Quemadmodum in plaustris, equus qui penultimus est plus

the phrase "alimenta socordiæ" (the point of which belongs to the translator and not to Demosthenes) without comparing it with the original. [I think, however, that the idea of "alimenta" is really involved in the word *ἐπαυξάνοντα*, when taken with the context, and that no other word could have given the meaning so well. To exhibit the full meaning in Demosthenes's words, it is necessary to quote the whole sentence. *Ἐὰν οὖν ἀλλὰ νῦν γ' ἔτι ἀπαλλαγέντες τούτων τῶν ἐθῶν ἐθελήσητε στρατεύεσθαί τε καὶ πράττειν ἀξίως ὑμῶν αὐτῶν, καὶ ταῖς περιουσίαις ταῖς οἴκοι ταύταις ἀφορμαῖς ἐπὶ τὰ ἔξω τῶν ἀγαθῶν χρήσησθε, ἴσως ἂν ἴσως ὦ ἄνδρες Ἀθηναῖοι τέλειόν τι καὶ μέγα κτήσαισθε ἀγαθόν, καὶ τῶν τοιούτων λημμάτων ἀπαλλαγείητε, ἃ τοῖς ἀσθενοῦσι παρὰ τῶν ἰατρῶν σιτίοις διδομένοις ἔοικε. καὶ γὰρ οὔτ' ἰσχὺν ἐκεῖνα ἐντίθησιν οὔτ' ἀποθνήσκειν ἐᾷ· καὶ ταῦτα, ἃ νέμεσθε νῦν ὑμεῖς, οὔτε τοσαῦτα ἐστιν ὥστε ὠφέλειαν ἔχειν τινὰ διαρκῆ, οὔτ' ἀπογόνοντας ἄλλο τι πράττειν ἐᾷ, ἀλλ' ἔστι ταῦτα τὴν ἑκάστου ῥᾳθυμίαν ὑμῶν ἐπαυξάνοντα.* The *λήμματα*, or *ταῦτα ἃ νέμεσθε νῦν ὑμεῖς*, to which Demosthenes alluded, were apparently the theoric fund; but it seems as if Bacon understood him to allude to the small advantages recently gained over Philip, which gave occasion to the speech; an interpretation which, if otherwise justifiable, would, I think, rather improve the sense. — *J. S.*]

[1] Horace. Ep. i. 2. 40. But *bene* is not in the original. Compare Ausonius, Epig. 81., and the proverbial phrase, *ἀρχὴ ἥμισυ παντός*, in Hesiod.

[2] That is, inchoate productions, not having the conditions requisite in order to their perfection and continuance. See Lucretius, v. 835. et sqq., on which passage Gassendi remarks: "Supponit nempe fuisse varia quasi tentamenta naturæ, adeo ut longe plura animalium genera quam quæ nunc habentur quasi affecta fuerint, sed ea tamen sola superfuerint quæ contigit perfici posse." See his Essay on Epicurus entitled *In Libr. X. Diog. Laert. de Physiol. Epicuri Animadversiones*, (1649) p. 650. Pliny alludes to a similar notion in his description of the convolvulus, — "veluti naturæ rudimentum, lilia facere condiscentis." — *Hist. Nat.* xxi. 11. Rapin's lines are merely a plagiarism of Pliny's phrase:

"Dulce rudimentum meditantis lilia quondam
Naturæ, cum sese opera ad majora parabat."

confert ad motum plaustri quam primus. Etiam non inepte dici solet; *Convitium regestum illud esse quod pugnæ sit reum.* Prius enim fortasse prætervolaturum fuisset. Itaque *prius malo principium dedit, sed posterius modum abstulit.* Fallit Sophisma secundo, propter dignitatem perseverantiæ; quæ in progressu, non in aggressu sita est. Etenim casus aut natura primum impetum progignere possunt; at affectus tantummodo maturus et judicium, constantiam. Fallit tertio in iis rebus, quarum natura et cursus ordinarius in contrarium rei incœptæ fertur; ita ut prima incœptio perpetuo evacuetur, nisi vires continuentur. Quemadmodum in formulis illis usitatis dicitur; *Non progredi, est regredi;* et *Qui non proficit, deficit;* ut in cursu in adversum montis; remigatione in adversum gurgitis. At contra, si in declivi montis motus incipiat, aut secundo flumine remigatio fiat, tum gradus incœptus longe potiores partes tenet. Porro iste Color non tantum extenditur ad gradum incœptionis qui sit a potentia ad actum, comparatum cum gradu qui sit ab actu ad incrementum; verum etiam ad gradum qui sit ab impotentia ad potentiam, comparatum cum gradu qui sit a potentia ad actum. Etenim gradus ab impotentia ad potentiam major videtur quam a potentia ad actum.

Sophisma.

10. *Quod ad veritatem refertur majus est quam quod ad opinionem. Modus autem et probatio ejus quod ad opinionem pertinet, hæc est; quod quis, si clam putaret fore, facturus non esset.*

Ita pronunciant Epicurei de Fœlicitate Stoicorum in Virtute collocata, quod similis sit fœlicitati histrionis in scena; qui si a spectatoribus et plausu eorum destitueretur, animis statim concideret. Itaque virtutem, per ignominiam, *Bonum Theatrale* vocant. Aliter fit in divitiis, de quibus ille,

——— Populus me sibilat; at mihi plaudo.[1]

Itidem in voluptate,

——— Grata sub imo
Gaudia corde premens, vultu simulante pudorem.[2]

[1] Horace, Sat. i. 1. 66.

[2] This is a quotation from the Latin translation of Theocritus by Hessus (Paris, 1546.). The original is,—

ὄμμασιν αἰδόμενα, κραδία δ' οἱ ἔνδον ἰάνθη.

a line which occurs near the end of the twenty-seventh Idyll. The translation, unlike most translations made in the sixteenth century, is printed without the text, and is exceedingly loose and paraphrastic. Eobanus Hessus has been supposed one of the authors of the *Epistolæ Obscurorum Virorum.*

ELENCHUS.

Fallacia hujus Sophismatis subtilior paulo est; licet responsio ad exemplum quod adducitur facilis. Neque enim virtus eligitur *propter auram popularem;* cum etiam illud præceptum sit, *Ut quis maxime omnium seipsum revereatur.*[1] Ita ut vir bonus idem fuerit in solitudine, idem in theatro. Licet forte intendatur virtus nonnihil per laudes, quemadmodum calor augetur per reflexionem. Sed hoc suppositionem negat, non fallaciam redarguit. Elenchus vero talis est. Dato, quod virtus (præsertim ea quæ labores et conflictus subit) non eligeretur, nisi quod laudes et fama eam comitari soleant; haud inde sequitur, quod appetitus et motus ad virtutem non sit præcipue propter se. Siquidem fama possit esse causa tantum *impulsiva* aut *sine qua non,* neutiquam efficiens aut constituens. Exempli gratia; si duo fuerint equi, quorum unus calcaribus non admotis quævis haud segniter præstaret, at alter calcaribus admotis priorem longe superaret; posterior iste (arbitror) palmam referet, et pro equo meliore judicabitur. Neque quenquam judicii sani commoverit formula illa; *Apage istum equum, cujus spiritus siti sunt in calcaribus.* Quandoquidem enim instrumentum ordinarium equitanti sit calcar, neque ullo modo oneri aut impedimento ei sit, non minoris propterea æstimandus est equus qui calcare incitatur; neque etiam ille alter, qui absque calcaribus mira præstat, eo ipso melior, sed delicatior tantum, habendus est. Simili ratione, gloria et honor virtuti pro stimulis et calcaribus subserviunt; ac licet virtus sine illis paulo futura esset languidior, tamen cum semper illa præsto sint ei etiam non invitata, nil officit quominus virtus propter se quoque expetatur. Itaque recte redarguitur illa positio; *Nota ejus rei, quod*[2] *propter opinionem et non propter veritatem eligitur, hæc est; quod quis si clam putaret fore, facturus non fuisset.*

SOPHISMA.

11. *Quod opera et virtute nostra partum est, majus bonum; quod ab alieno beneficio vel ab indulgentia fortunæ delatum est, minus bonum.*

Causæ hujus rei hæ sunt: primo, propter Spem de Futuro. Siquidem in aliorum gratia aut fortunæ ipsius ventis secundis, non multum inest certitudinis; propria vero industria aut

[1] πάντων δὲ μάλιστ' αἰσχύνεο σαυτόν. PYTHAGORAS, *Aur. Vers.* v. 12.

[2] So in the original.—*J. S.*

virtus semper domi adsunt. Adeo ut postquam boni quid nobis hoc modo paratum fuerit, maneant etiam eadem instrumenta in novos usus parata; quin et consuetudine et successu reddita validiora. Secundo, quia quod alieno beneficio adipiscimur, ejus etiam aliis debitores sumus; cum quæ per nos ipsi comparaverimus nihil oneris secum trahant. Etiam si quid indulgentia divina in nos cumulaverit, retributionem quandam erga Dei bonitatem efflagitat, quod homines pravos et improbos mordet; ubi in priore genere illud Prophetæ usuveniat, *Lætantur et exultant, immolant plagis suis, et sacrificant reti suo.*[1] Tertio, quia ea quæ a virtute nostra minime profecta sunt, nulla sequitur laus et existimatio. Quæ enim fœlicitatis sunt, admirationem quandam pariunt, laudem minime. Sicut ait Cicero ad Cæsarem; *Quæ miremur habemus, quæ laudemus expectamus.*[2] Quarto, quia quæ industria propria acquiruntur, cum laboribus et contentione fere conjuncta sunt, quod nonnullam habet in se suavitatem; uti Salomon, *Suavis cibus a venatu.*[3]

ELENCHUS.

At quatuor inveniuntur Colores Oppositi, qui rem in contrariam partem inclinant, possintque esse prioribus instar Elenchorum. Primo, quia Fœlicitas videtur esse signum quoddam et character Favoris Divini; et propterea tum in nobismetipsis confidentiam et alacritatem generat, tum apud alios authoritatem et reverentiam. Fœlicitas autem ista etiam fortuita complectitur, ad quæ virtus ægre aspirat; veluti cum Cæsar ad navis gubernatorem animos addendo dixit, *Cæsarem portas et fortunam ejus.*[4] Quod si dixisset, *Cæsarem portas et virtutem ejus*, frigidum prorsus fuisset solatium periclitanti in procella. Secundo, quia ea quæ a virtute aut industria procedunt sunt imitabilia, et aliis patent; cum fœlicitas sit res inimitabilis, et prærogativa quædam hominis individui. Itaque

[1] Habakkuk, i. 15, 16.

[2] Cicero pro Marcello, c. 9.; but the quotation is inaccurate. [The meaning, however, is accurately given; which (as in the passage from Demosthenes, p. 681.) could not have been done in the exact words of the original without a long quotation, much of which would have been irrelevant. When Bacon quotes an author as "saying" anything, we are always to understand the words "in effect." — *J. S.*]

[3] In the *Colours of Good and Evil*, of which this tract is only an expansion, this sentence is given in Latin as here, but without any reference to Solomon. There are one or two of Solomon's proverbs to the same purpose, but none I think in these words. It was probably suggested to Bacon by something in Solomon, and turned into its present shape by himself. In after years, remembering where the thought came from, he may easily have forgotten that the expression was his own. — *J. S.*

[4] Plutarch, De Fortunâ Romanâ. p. 319.

in genere videmus res naturales artificialibus præponi, quia imitationem non recipiunt. Quod enim imitabile est, potentia vulgatum est. Tertio, quæ ex fœlicitate proveniunt, bona videntur gratuita, nec laboribus empta; at quæ virtute propria, pretio veluti acquisita. Itaque eleganter Plutarchus de rebus Timoleontis, hominis longe fortunatissimi, cum rebus Agesilai et Epaminondæ qui uno ævo vixerunt comparatis, dixit: *Illas Homeri carminibus fuisse similes, quæ, cum alias excellant, sponte etiam fluere videantur, et quasi Genium sapere.*[1] Quarto, quia quod præter spem aut præter expectatum contingit, gratius et majore cum voluptate in hominum animos influit. Illud vero neutiquam competit iis, quæ propria cura et ambitu comparantur.

SOPHISMA.

12. *Quod ex pluribus constat et divisibilibus, est majus quam quod ex paucioribus et magis unum; nam omnia per partes considerata majora videntur. Quare et pluralitas partium magnitudinem præ se fert; fortius autem operatur pluralitas partium, si ordo absit; nam inducit similitudinem infiniti, et impedit comprehensionem.*

Sophisma istud videtur etiam primo intuitu fallax, et quasi palpabile; siquidem non pluralitas partium tantum, sed majoritas earundem, poterit constituere totum auctius. Attamen abripit hoc ipsum Sophisma sæpius phantasiam; quinetiam insidiatur sensui. Etenim aspectui ipsi brevior videtur via in planitie, ubi nihil intercurrat quod visum frangat, quam in tali tractu terræ ubi simul conspiciuntur arbores, aut ædificia, aut aliud aliquod signum quod spatium metiri et dividere possit. Sic homini bene nummato, postquam arcas suas et marsupia diviserit et digesserit, major etiam quam antea subit divitiarum phantasia. Habet etiam vim in amplificationibus, si res in plures portiones dividatur, atque singulæ seorsum tractentur. Hoc vero adhuc magis phantasiam implet, si fiat promiscue et sine ordine. Confusio enim multitudinis opinionem generat. Siquidem quæ ordine ostenduntur aut proponuntur, tum ipsa magis finita apparent, tum certum præbent argumentum nihil esse prætermissum. At contra, quæ confuse repræsentantur non solum in se numerosa putantur, sed et suspicioni locum relinquunt restare adhuc plura quæ omittuntur.

[1] Plutarch in Timol. c. 36.

ELENCHUS.

Fallit Sophisma primo, ubi quis ampliorem præceperit de re aliqua opinionem quam pro vera rei ipsius magnitudine. Etenim cum hoc fit, distributio falsam illam opinionem destruet, et rem in veritate sua, non autem cum amplificatione, monstrabit. Itaque si quis morbo aut dolore corripiatur, horæ longiores ei videbuntur absque horologio aut clepsydra, quam si iisdem mensurentur. Nam si tædium et vexatio morbi tempus videri longius faciunt quam revera est, at computatio temporis errorem illum corrigit, et brevius facit quam opinio illa falsa conceperat. Etiam in planitie, contra quam superius dictum est aliquando evenit. Licet enim visus in principio viam ostentet breviorem sensui, quia indivisa est; tamen si ex eo obrepat opinio de longe minori intervallo quam reperitur, opinionis ejus vanæ frustratio efficiet ut videatur demum etiam quam revera est productior. Itaque si quis opinioni alicujus falsæ de magnitudine rei cujuspiam velificari cupiat, caveat a distributionibus, sed rem integram utique extollat. Fallit Sophisma secundo, si distributio ea distrahatur, non autem simul obversetur, aut uno aspectu visum feriat. Itaque si flores in horto aliquo in plures torulos distinguantur, majoris quantitatis speciem præbebunt quam si omnes in uno toro simul crescerent, modo toruli illi oculis simul subjiciantur; aliter enim unio distributioni distractæ prævalebit. Sic reditus eorum majores videntur, quibus prædia et latifundia sua vicina aut conjuncta sunt. Nam, si sparsim sita sint, non veniunt tam facile sub aspectum. Fallit Sophisma tertio, propter dignitatem unitatis supra multitudinem. Omnis enim compositio, indigentiæ in singulis signum est certissimum; ubi illud usu venit,

Et quæ non prosunt singula, multa juvant.[1]

Itaque Mariæ partes potiores; *Martha, Martha, attendis ad plurima, unum sufficit.*[2] Hinc illa fabula Æsopi de vulpe et feli. Jactabat enim vulpes quantas artes haberet et effugia, quibus se a canibus eriperet; felis autem se unico tantum confidere auxilio dixit, utpote quæ tenuem scandendi facultatem haberet; quod tamen reliquis illis vulpinis longe præstantius præsidium fuit: unde adagium; *Multa novit vulpes, sed felis unum magnum.*[3] Quinetiam in hujus fabulæ significatione morali

[1] Ovid. Rem. Amor 420.

[2] St. Luke, x. 41, 42.

[3] "Multa novit vulpes, sed echinus unum magnum," is a proverb in Erasmus's collection. Vide Er. Adag. i. 5. 18.

idem cernitur. Nam potenti et fido amico niti plus præsidii habet, quam artes et astutiæ complurimæ.

Atque hæc exempli loco sufficient. Superest autem nobis ejusmodi Colorum numerus etiam magnus, quos olim adolescentes congessimus; attamen sine illustrationibus suis atque Elenchis; quos hoc tempore concinnare non vacat. Ideoque Colores illos nudos absque illustrationibus suis (cum superiores isti vestiti prodeant) proponere, minime nobis consentaneum videtur. Illud interim monemus; rem istam, qualiscunque ea videri possit, haud parvi judicio nostro esse pretii: utpote quæ ex Philosophia Prima, et ex Politica, et ex Rhetorica participet. Atque de Signis Popularibus sive Coloribus Boni ac Mali apparentis, tam Simplicis quam Comparati, hactenus.

Secunda Collectio, quæ pertinet ad Promptuariam, et *desideratur*, ea est quam Cicero (ut superius in Logica diximus[1]) innuit; cum præcipit, ut in promptu habeantur Loci Communes, in utramque partem disputati et tractati. Quales sunt, *Pro verbis legis* et *Pro sententia legis*, &c. Nos vero hoc præceptum etiam ad alia extendimus; ut non solum ad genus Judiciale, sed etiam ad Deliberativum et Demonstrativum adhibeatur. Omnino hoc volumus, Locos omnes quorum frequens est usus (sive ad probationes et refutationes, sive ad suasiones et dissuasiones, sive ad laudes et vituperia spectent) meditatos jam haberi; eosque ultimis ingenii viribus, et tanquam improbe et prorsus præter veritatem, attolli et deprimi. Modum autem hujus collectionis, tam ad usum quam ad brevitatem, optimum fore censemus, si hujusmodi Loci contrahantur in sententias quasdam acutas et concisas[2]; tanquam glomos quosdam, quorum fila in fusiorem discursum, cum res postulat, explicari possint. Atque similem quandam diligentiam in Seneca[3] reperimus, sed in hypothesibus sive casibus. Ejus generis, cum plurima parata habeamus, aliqua ad exemplum proponere visum est. Ea autem *Antitheta Rerum* nominamus.[4]

[1] Suprà, p. 634.

[2] The habit of reducing arguments into this form accounts probably for the difficulty of verifying many of Bacon's quotations. The form fittest for the *promptuaria* was the form easiest to remember and most convenient to use. See notes 2 and 3, p. 685. — *J. S.*

[3] The Seneca here referred to is M. Annæus Seneca, the rhetorician, who is supposed to have been the uncle of L. Annæus Seneca, the preceptor of Nero.

[4] Of these Antitheta many are Bacon's own, and are to be found in other parts of

Exempla *Antithetorum.*

I. Nobilitas.

Pro.

Quibus virtus a genere penitus insita est, ii jam non mali esse nolunt, sed nequeunt.

Nobilitas laurea, qua tempus homines coronat.

Antiquitatem etiam in monumentis mortuis veneramur; quanto magis in vivis?

Si nobilitatem familiarum contemnas, quæ tandem erit differentia inter sobolem hominum et brutorum?

Nobilitas virtutem invidiæ subducit, gratiæ tradit.

Contra.

Raro ex virtute nobilitas; rarius ex nobilitate virtus.

Nobiles majorum deprecatione ad veniam sæpius utuntur, quam suffragatione ad honores.

Tanta solet esse industria hominum novorum, ut nobiles præ illis tanquam statuæ videantur.

Nobiles in stadio respectant nimis sæpe; quod mali cursoris est.

II. Forma.

Pro.

Deformes naturam ulcisci solent.

Et virtus nil aliud quam interna forma; et forma nil aliud quam externa virtus.

Deformes se a contemptu per malitiam utique suam vindicare cupiunt.

Forma virtutes splendere facit, vitia rubere.

Con.

Virtus, ut gemma nobilis, melius inseritur sine multo auro et ornatu.

Quod vestis lauta deformi, hoc forma improbo.

Similiter plerunque leves sunt quos forma ornat et quos movet.

III. Juventus.

Pro.

Primæ cogitationes, et juvenum consilia, plus habent e numine.

Con.

Juventus pœnitentiæ campus.

Ingenitus est juvenibus se-

his writings; others are doubtless quotations, of which I shall mention some, though many more might probably be easily pointed out. [A great many of them will be found in the *Essays.* — *J. S.*]

Senes sibi sapiunt magis, aliis et reipublicæ minus.

Si conspici daretur, magis deformat animos quam corpora senectus.

Senes omnia metuunt, præter Deos.

nilis authoritatis contemptus; ut quisque suo periculo sapiat.

Tempus, ad quæ consilia non advocatur, nec rata habet.

Senibus Veneres mutantur in Gratias.[1]

IV. Valetudo.

Pro.

Cura valetudinis animum humilem facit et corpori supplicem.

Corpus sanum hospes animæ est; ægrum, ergastularius.

Nil tam summas actionum promovet, quam prospera valetudo; at contra infirma feriatur nimis.

Con.

Sæpe convalescere est sæpe juvenescere.

Excusatio valetudinis polychresta; ad quam etiam sani confugimus.

Nimis arcto fœdere corpus animæ jungit sanitas.

Et lectus magna imperia administravit, et lectica magnos exercitus.

V. Uxor et Liberi.

Pro.

Charitas reipublicæ incipit a familia.

Uxor et liberi disciplina quædam humanitatis; at cœlibes tetrici et severi.

Cœlibatus et orbitas ad nil aliud conferunt, quam ad fugam.

Morti sacrificat, qui liberos non procreat.

Cætera fœlices, in liberis fere infortunati sunt; ne divinæ sorti nimium appropinquent homines.[2]

Con.

Qui uxorem duxit et liberos suscepit, obsides fortunæ dedit.

Generare et liberi, humana sunt; creare et opera, divina.

Brutorum æternitas soboles; Virorum, fama, merita, et instituta.

Œconomicæ rationes publicas plerunque evertunt.

Aliquibus fortuna Priami placuit, qui suis omnibus superstes fuit.[3]

[1] This idea has been expressed in a different form by Mr. Milnes: —

"On that deep retiring shore
Frequent pearls of beauty lie;
Where the passion-waves of yore
Fiercely beat and mounted high."

[2] This seems to me to belong more properly to the other side of the argument; but if it be rightly placed where it is, it must mean that to be happy in his children is happiness too great for a man, unless it be balanced by misfortune in other ways.—*J. S.*

[3] The allusion is to Tiberius. See Suet. in Tiber. c. 62.

VI. Divitiæ.

Pro.

Divitias contemnunt, qui desperant.

Invidia divitiarum virtutem effecit deam.

Dum philosophi dubitant utrum ad virtutem an voluptatem omnia sint referenda, collige instrumenta utriusque.

Virtus per divitias vertitur in commune bonum.

Cætera bona provincialem habent administrationem, divitiæ solæ generalem.

Con.

Divitiarum magnarum vel custodia est, vel dispensatio quædam, vel fama; at nullus usus.

Annon vides lapillis et id genus deliciis fingi pretia, ut possit esse aliquis magnarum divitiarum usus?

Multi dum divitiis suis omnia venalia fore credide-runt, ipsi in primis venerunt.

Non aliud divitias dixerim, quam impedimenta virtutis; nam virtuti et necessariæ sunt, et graves.

Divitiæ bona ancilla, pessima domina.

VII. Honores.

Pro.

Honores non tyrannorum (ut loquuntur), sed Providentiæ Divinæ calculi sunt.

Honores faciunt et virtutes et vitia conspicua; itaque illas provocant, hæc refrænant.

Non novit quispiam quantum in virtutis cursu profecerit, nisi honores ei campum præbeant apertum.

Virtutis, ut rerum aliarum, rapidus motus est ad locum, placidus in loco; est autem virtutis locus honos.

Con.

Dum honores appetimus libertatem exuimus.

Honores dant fere potestatem earum rerum, quas optima conditio est nolle, proxima non posse.

Honorum ascensus arduus, statio lubrica, regressus præceps.

Qui in honore sunt, vulgi opinionem mutuentur oportet, ut seipsos beatos putent.

VIII. Imperia.

Pro.

Fœlicitate frui, magnum bonum est; sed eam et aliis impertiri posse, adhuc majus.

Con.

Quam miserum habere nil fere quod appetas, infinita quæ metuas.

Reges non hominum instar sed astrorum sunt; nam et in singulos et in tempora ipsa magnum habent influxum.

Qui Dei vices gerunt, iis resistere non tantum læsæ majestatis crimen est, sed theomachia quædam.

Qui in imperiis sunt, similes sunt corporibus cœlestibus, quæ magnam venerationem habent, requiem nullam.[1]

Nemo humanæ sortis ad Deorum convivia admittitur, nisi ad ludibrium.

IX. Laus, Existimatio.

Pro.

Virtutis radii reflexi laudes.

Laus honor is est, ad quem liberis suffragiis pervenitur.

Honores a diversis politiis conferuntur; sed laudes ubique sunt libertatis.

Vox populi habet aliquid divinum. Nam quomodo aliter tot capita in unum conspirare possint?[2]

Ne mireris, si vulgus verius loquatur quam honoratiores; quia etiam tutius loquitur.

Con.

Fama deterior judex quam nuncia.

Quid viro bono cum saliva vulgi?

Fama, veluti fluvius, levia attollit, solida mergit.

Infimarum virtutum apud vulgus laus est; mediarum admiratio; supremarum sensus nullus.

Laus magis ex ostentatione quam ex merito, et ventosis magis accedit quam realibus.

X. Natura.

Pro.

Consuetudinis progressus est arithmeticus; naturæ geometricus.

Ut in rebuspublicis se habent leges communes erga consuetudines, eodem modo in singulis se habet natura ad consuetudinem.

Consuetudo contra naturam, quasi tyrannis quædam est; et cito ac levi occasione corruit.

Con.

Cogitamus secundum naturam; loquimur secundum præcepta; sed agimus secundum consuetudinem.

Natura pedantius quidam est; consuetudo magistratus.

[1] "Ex quo se Cæsar orbi terrarum dedicavit, sibi eripuit; et siderum modo, quæ irrequieta semper cursus suos explicant, nunquam illi licet nec subsistere nec quicquam suum facere." — *Senec. Consol. ad Polyb.* c. 26.

[2] φήμη δ' οὔτις πάμπαν ἀπόλλυται ἥντινα πολλοὶ
λαοὶ φημίζουσι· θέος νύ τίς ἐστι καὶ αὐτή. Hesiod, *Op. et Dies.* v. 683

XI. Fortuna.

Pro.

Virtutes apertæ laudes pariunt, occultæ fortunas.

Virtutes officiorum laudes pariunt, facultatum fortunas.

Fortuna veluti Galaxia; hoc est, nodus quarundam obscurarum virtutum, sine nomine.

Fortuna saltem ob filias suas honoranda est; Confidentiam scilicet, et Authoritatem.

Con.

Stultitia unius, fortuna alterius.

In fortuna illud præcipue laudaverim, quod cum non eligat, non tueatur.

Viri magni, dum invidiam virtutum suarum declinarunt, inter fortunæ cultores reperti sunt.

XII. Vita.

Pro.

Absurdum est accidentia vitæ magis amare, quam vitam ipsam.

Præstat ad omnia, etiam ad virtutem, curriculum longum quam breve.

Absque spatiis vitæ majoribus, nec perficere datur, nec perdiscere, nec pœnitere.

Con.

Philosophi, dum tantum apparatum adversus mortem colligunt, ipsam magis timendam effecerunt.

Mortem homines timent, quia nesciunt; ut pueri tenebras.

Non invenias inter humanos affectum tam pusillum, qui si intendatur paulo vehementius non mortis metum superet.

Mori velle non tantum fortis, aut miser, aut prudens, sed etiam fastidiosus potest.[1]

XIII. Superstitio.

Pro.

Qui zelo peccant non probandi, sed tamen amandi sunt.

Mediocritates moralibus debentur, extremitates divinis.

Con.

Ut simiæ similitudo cum homine deformitatem addit, ita superstitioni similitudo cum religione.

[1] "Mori velle, non tantum prudens et fortis, sed etiam fastidiosus potest." — *Seneca, Ep.* 77.

Superstitiosus religiosus designatus.

Fabulosissima quæque portenta cujusvis religionis citius crediderim, quam hæc omnia sine numine fieri.

Quale odium est affectationis in civilibus, tale superstitionis in divinis.

Præstat nullam habere de Diis opinionem, quam contumeliosam.

Non Epicuri schola, sed Stoa, veteres respublicas perturbavit.

Non cadit in mentem humanam, ut sit merus atheista dogmate; sed magni hypocritæ sunt veri atheistæ, qui sacra perpetuo contrectant, sed nunquam verentur.

XIV. Superbia.

Pro.

Superbia etiam vitiis insociabilis; atque ut venenum veneno, ita haud pauca vitia superbia expelluntur.

Facilis, etiam alienis vitiis obnoxius est; superbus tantum suis.

Superbia, si ab aliorum contemptu ad sui contemptum ascendet, fiet demum philosophia.

Con.

Hedera virtutum ac bonorum omnium superbia.

Cætera vitia virtutibus tantum contraria; superbia sola contagiosa.

Superbia optima vitiorum conditione caret, id est, latebris.

Superbus, cum cæteros contemnit, se interim negligit.

XV. Ingratitudo.

Pro.

Crimen ingrati animi nil aliud est, quam perspicacia quædam in causam beneficii collati.[1]

Dum grati erga quosdam esse volumus, nec cæteris justitiam præstamus, nec nobis ipsis libertatem.

Con.

Crimen ingrati animi non suppliciis coërcetur, sed Furiis permittitur.

Arctiora sunt vincula beneficiorum quam officiorum; quare, qui ingratus, injustus, et omnia.

Ea est conditio humana:

[1] This sentence is more, I think, in the manner of Rochefoucauld than any other in Bacon's writings.

Beneficii gratia eo minus reddenda est, quod de pretio non constat.

nemo tam publica fortuna natus est, quin privatæ et gratiæ et vindictæ se omnino debeat.

XVI. Invidia.

Pro.

Naturale est exprobrationem fortunæ suæ odisse.

Invidia in rebuspublicis tanquam salubris ostracismus.

Con.

Invidia festos dies non agit.

Nemo virtuti invidiam reconciliaverit præter mortem.

Invidia virtutes laboribus exercet, ut Juno Herculem.

XVII. Impudicitia.

Pro.

Zelotypiæ debetur, quod castitas sit facta virtus.

Multa tristitia opus est, ut quis Venerem rem seriam putet.

Quid vel diætæ partem, vel munditiæ speciem, vel superbiæ filiam, inter virtutes collocas?

Amorum, ut avium silvestrium, nulla proprietas est, sed jus possessione transfertur.

Con.

Pessima Circes transformatio impudicitia.

Impudicus prorsus reverentiam sui perdidit; quod frænum est omnium vitiorum.

Omnes, ut Paris, qui formæ optionem faciunt, prudentiæ et potentiæ jacturam faciunt.

In veritatem non vulgarem incidit Alexander, cum Somnum et Venerem mortis arrhabones esse dixit.

XVIII. Crudelitas.

Pro.

Nulla virtutum tam sæpe rea est, quam clementia.

Crudelitas, si a vindicta est, justitia est; si a periculo, prudentia.

Qui misericordiam inimico impertit, sibi denegat.

Non sæpius phlebotomiæ necessariæ sunt in curationibus, quam cædes in civilibus.

Con.

Cædibus grassari, aut feræ aut Furiæ est.

Crudelitas viro bono semper fabulosa esse videtur, et fictio tragica.

XIX. Gloria Vana.

Pro.

Qui suas laudes appetit, aliorum simul appetit utilitates.

Qui tam sobrius est ut nihil alienum curet, vereor ne et publica aliena putet.

Ingenia in quibus aliquid inane est, facilius curam reipublicæ recipiunt.

Con.

Gloriosi semper factiosi, mendaces, mobiles, nimii.

Thraso Gnathonis præda.[1]

Turpe est proco sollicitare ancillam; est autem virtutis ancilla laus.

XX. Justitia.

Pro.

Imperia et politiæ justitiæ tantum additamenta sunt; si enim justitia aliter possit exerceri, illis minime fuerit opus.

Justitiæ debetur, quod homo homini sit Deus, non lupus.

Justitia etsi vitia tollere non possit, tamen hoc efficit ut non lædant.

Con.

Si hoc est justum esse, quæ tibi fieri nolis ea alteri non facere, clementia demum justitia est.

Si suum cuique tribuendum est, certe et venia humanitati.

Quid mihi æquitatem narras, cum sapienti omnia inæqualia sint?[2]

Considera qualis reorum conditio fuerit apud Romanos, et pronuncia justitiam e republica non esse.

Vulgaris ista justitia politiarum, philosophus in aula; hoc est, facit tantum ad reverentiam imperantium.

[1] The allusion is to the *Eunuchus* of Terence.

[2] [So in the original edition; but] the sense requires *inæqualia* to be replaced by *æqualia*. There is no colour for the assertion that to the wise man all things are unequal; but the Stoics, teaching that, except the distinction between right and wrong, everything is to the wise man a matter of indifference, went on to maintain that he could suffer wrong from no man, because no change of outward circumstance could in any degree affect his inward and essential happiness. There is a treatise by Seneca, of which the title is *In Sapientem non cadere Injuriam*, in which this doctrine is taught. So far as the wise man was concerned, the difference between justice and injustice was of no moment whatever, — a view which shows how strongly Stoicism tended to isolate ach of its disciples from the rest of mankind. Even in Plato the same way of thinkng may be observed. Cf. the words ascribed to Socrates in the *Apology*: ἐμὲ μὲν γὰρ δὴν βλάψει οὔτε Μέλιτος οὔτε Ἄνυτος.

XXI. Fortitudo.

Pro.

Nil terribile nisi ipse timor.

Nil aut in voluptate solidum aut in virtute munitum, ubi timor infestat.

Qui pericula apertis oculis intuetur ut excipiat, advertit et ut evitet.

Cæteræ virtutes nos a dominatu liberant vitiorum; fortitudo sola a dominatu fortunæ.

Con.

Præclara virtus, velle perire ut perdas.

Præclara virtus, quam etiam ebrietas inducit.

Vitæ suæ prodigus, alienæ periculosus.

Virtus ferreæ ætatis fortitudo.

XXII. Temperantia.

Pro.

Eadem fere vis abstinendi et sustinendi.

Uniformitates, concordiæ, et mensuræ motuum cœlestia sunt, et characteres æternitatis.

Temperantia, velut frigora salubria, animi vires colligit et firmat.

Exquisiti et vagi sensus narcoticis indigent; similiter et affectus.

Con.

Negativæ istæ virtutes non placent; nam innocentiam præstant, non merita.

Languet mens quæ excessibus caret.

Amo virtutes quæ excellentiam actionis inducunt, non hebetudinem passionis.

Cum consonantes animi motus ponis, paucos ponis; nam pauperis est, numerare pecus.

Ista *Non uti ut non appetas; Non appetere ut non timeas;* pusillanimi sunt et diffidentis.

XXIII. Constantia.

Pro.

Basis virtutum constantia.

Miser est, qui qualis ipse futurus sit non novit.

Imbecillitas humani judicii rebus ipsis constare non potest; quare saltem sibi constet.

Etiam vitiis decus aspirat constantia.

Si ad fortunæ inconstan-

Con.

Constantia, ut janitrix morosa, multa utilia indicia abigit.

Æquum est ut constantia res adversas bene toleret; nam fere inducit.

Stultitia brevissima optima.

tiam accedat etiam inconstantia mentis, in quantis tenebris vivitur!

Fortuna tanquam Proteus, si perseveres, ad formam redit.

XXIV. Magnanimitas.

Pro.

Si animus semel generosos fines optaverit, statim non modo virtutes circumstant, sed et numina.

Virtutes ex habitu aut præceptis, gregales sunt; ex fine, heroïcæ.

Con.

Magnanimitas est virtus poëtica.

XXV. Scientia, Contemplatio.

Pro.

Ea demum voluptas est secundum naturam, cujus non est satietas.

Dulcissimus prospectus in errores aliorum subjacentes.

Quam bonum est orbes mentis habere concentricos universo!

Omnes affectus pravi falsæ æstimationes sunt; atque eadem sunt bonitas et veritas.

Con.

Contemplatio, speciosa inertia.

Bene cogitare non multo melius est, quam bene somniare.

Orbem Numen curat, tu patriam.

Vir politicus etiam contemplationes serit.

XXVI. Literæ.

Pro.

Si de rebus minutis libri scripti forent, vix ullus esset experientiæ usus.

Lectio est conversatio cum prudentibus; actio fere cum stultis.

Non inutiles Scientiæ existimandæ sunt, quarum in se nullus est usus, si ingenia acuant et ordinent.

Con.

In Academiis discunt credere.

Quæ unquam Ars docuit tempestivum Artis usum?

Sapere ex regula et ex experientia, plane contrariæ rationes sunt; ut qui alteri assuefactus sit, ad alterum sit ineptus.

Artis sæpissime ineptus usus est, ne sit nullus.

Hoc fere omnes Academici habent, ut ex qualibet re soleant agnoscere quod sciant, et non addiscere quod nesciant.

XXVII. Promptitudo.

Pro.

Opportuna prudentia non est, quæ celeris non est.

Qui cito errat, cito errorem emendat.

Qui ex composito et non obiter prudens est, nil magni facit.

Con.

Prudentia non alte petitur, quæ præsto est.

Prudentia, ut vestis, levis quæ expedita.

Cujus consilia non maturat deliberatio, nec prudentiam ætas.

Quæ ad breve tempus excogitantur, ad breve tempus placent.

XXVIII. Taciturnitas in Secretis.

Pro.

Taciturno nil reticetur; quia omnia tuto communicantur.

Qui facile loquitur quæ scit, loquitur et quæ nescit.

Secretis etiam mysteria debentur.

Con.

Varietas morum optime animum collocat in secreto.

Taciturnitas confessoris virtus.

Taciturno omnia reticentur; quia silentium rependitur.

Tectus, ignoto proximus.

XXIX. Facilitas.

Pro.

Amo virum alieno affectui obnoxium, sed tamen judicium ab obsequio revocantem.

Flexibilem esse, ad naturam auri proxime accedit.

Con.

Facilitas, judicii quædam inepta privatio.

Facilium beneficia, debita videntur; negationes, injuriæ.

Sibi gratiam habet, qui a facili aliquid impetrat.

Facilem omnes difficultates premunt, nam omnibus se implicat.

Facilis fere se recipit cum pudore.

XXX. Popularitas.

Pro.

Prudentibus eadem fere placent; at stultorum varietati occurrere, prudentiæ est.

Colere populum, est coli.

Qui ipsi magni viri sunt, neminem unum fere habent quem vereantur, sed populum.

Con.

Qui valde cum stultis congruit, ipse suspectus esse potest.

Qui turbæ placet, fere et turbas miscet.

Nil moderatum vulgo gratum est.

Infima assentatio est assentatio vulgi.

XXXI. Loquacitas.

Pro.

Qui silet, aut alios habet pro suspectis aut suspectus est ipse sibi.

Custodiæ omnes infœlices, miserrima silentii.

Silentium, stultorum virtus. Itaque recte ille silenti: Si prudens es, stultus es; si stultus, prudens.[1]

Silentium, veluti nox, insidiis opportunum.

Cogitationes in profluente sanissimæ.

Silentium, solitudinis genus.

Opinioni se venditat, qui silet.

Silentium nec pravas cogitationes egerit, nec bonas distribuit.

CON.

Silentium verbis et gratiam addit et auctoritatem.

Silentium, veluti somnus quidam, alit prudentiam.

Silentium fermentatio cogitationum.

Stilus prudentiæ silentium.

Silentium ambit veritatem.

XXXII. Dissimulatio.

Pro.

Dissimulatio compendiaria sapientia.

Non idem dicere, sed idem spectare, debemus.

Con.

Cum cogitare secundum rerum veritatem non possimus, at loquamur secundum cogitationem.

[1] This sarcasm is ascribed by Diogenes Laertius and Plutarch to Theophrastus, the author of the *Characters* (which form the foundation of those of La Bruyère) and of many other works. It has also been ascribed to Simonides. Bacon seems to have taken it from Plutarch.

Etiam in animo deformis nuditas.

Dissimulatio et decori est, et præsidio.

Sepes consiliorum dissimulatio.

Aliqui bono suo falluntur.

Qui indissimulanter omnia agit, æque decipit; nam plurimi aut non capiunt aut non credunt.

Indissimulatio nihil aliud, quam animi impotentia.

Quibus artes civiles supra captum ingenii sunt, iis dissimulatio pro prudentia erit.

Qui dissimulat, præcipuo ad agendum instrumento se privat, i. e. fide.

Dissimulatio dissimulationem invitat.

Qui dissimulat, liber non est.

XXXIII. Audacia.

Pro.

Docet improbare qui verecundatur.

Quod actio oratori, id audacia viro civili; primum, secundum, tertium.

Confitentem verecundiam amo, accusantem odi.

Confidentia morum animos promptius sociat.

Placet obscurus vultus, et perspicua oratio.

Con.

Audacia stultitiæ viator.

Inverecundia inutilis nisi ad imposturam.

Confidentia stultorum imperatrix, prudentium scurra.

Audacia est stupor quidam sensus, cum malitia voluntatis.

XXXIV. Cæremoniæ, Puntos[1], Affectatio.

Pro.

Vultus et gestus decora moderatio, verum condimentum virtutis.

Si et in verbis vulgo paremus, quidni in habitu et gestu?

Qui in levibus et quotidiana consuetudine decus non retinet, sit licet vir magnus, noris

Con.

Quid deformius, quam scenam in vitam transferre?

Ex ingenuitate decorum, ex arte odium.

Magis placent cerussatæ buccæ et calamistrata coma, quam cerussati et calamistrati mores.

Qui animum ad tam exiles

[1] This word is clearly a mere gloss, being the English, if it can be called so, of that which precedes it. A little further on Bacon uses the word "punctus" as a Latin version of "punto;" and the text might be corrected by substituting *puncti* for *puntos*. But I should prefer to omit this word altogether.

tamen hunc tantum certis horis sapere.

Virtus et prudentia, sine punctis, velut peregrinæ linguæ sunt; nam vulgo non intelliguntur.

Qui vulgi sensum per congruitatem non novit, is si nec per observationem noverit, omnium stultissimus est.

Puncti, translatio sunt virtutis in linguam vernaculam.

observationes applicat, magnæ cogitationis capax non est.

Affectatio, ingenuitatis putredo lucens.[1]

XXXV. Joci.

Pro.

Oratorum ara jocus.

Qui in omnibus modestum leporem miscet, libertatem animi retinet.

Res est supra opinionem politica, facile transire a joco ad serium, a serio ad jocum.

Veritatis alias non perventuræ sæpe vehiculum jocus.

Con.

Istos deformitatum ac concinnitatum aucupes, quis non contemnat?

Rerum magnitudinem eluere joco, improbum artificium est.

Jocos tum considera, cum risu destituti sunt.

Faceti isti fere non penetrant ultra superficiem rerum, ubi joci sedes est.

Ubi jocus ad seria momenti aliquid habet, ibi levitas puerilis est.

XXXVI. Amor.

Pro.

Annon vides omnes se quærere? At amans solus se invenit.

Non est melior ordinatio animi, quam ex imperio affectus alicujus insignis.

Qui sapit, desiderium quærat; nam qui non aliquid in-

Con.

Amori multum debet scena, nihil vita.

Nil tam varii nominis est quam amor; nam res aut tam stulta est ut se nesciat, aut tam turpis ut se fuco condat.

Odi istos Mono-Phrontistas.

[1] The same image occurs in Ralegh's *Lye*:

"Go tell the Court it glows
And shines like rotten wood."

signiter appetit, ei omnia ingrata sunt et tædio plena.[1]

Quidni in unitate acquiescat unus?

Angusta admodum contemplatio amor.

XXXVII. Amicitia.

Pro.

Eadem facit amicitia quæ fortitudo, sed suavius.

Suave condimentum omnium bonorum amicitia.

Pessima solitudo, non veras habere amicitias.

Digna malæ fidei ultio, amicitiis privari.

Con.

Qui amicitias arctas copulat, novas necessitates sibi imponit.

Animi imbecilli est, partiri fortunam.

XXXVIII. Adulatio.

Pro.

Adulatio magis ex more, quam ex malitia.

Laudando instituere, semper formula fuit debita potentioribus.

Con.

Adulatio stilus servorum.

Adulatio calx vitiorum.

Adulatio aucupii illud genus, quod similitudine vocis aves fallit.

Adulationis deformitas comica, nocumentum tragicum.

Auribus mederi difficillimum.

XXXIX. Vindicta.

Pro.

Vindicta privata, justitia agrestis.

Qui vim rependit, legem tantum violat, non hominem.

Utilis metus ultionis privatæ; nam leges nimium sæpe dormiunt.

Con.

Qui injuriam fecit, principium malo dedit; qui reddidit, modum abstulit.

Vindicta, quo magis naturalis, eo magis coërcenda.

Qui facile injuriam reddit, is fortasse tempore, non voluntate, posterior erat.

XL. Innovatio.

Pro.

Omnis medicina innovatio.

Con.

Novi partus deformes sunt.

[1] "Qui nolet fieri desidiosus, amet." Ov. *Amores*, l. 9. 46. This is one of the lines contained in Bacon's *Promus*. — *J. S.*

Qui nova remedia fugit, nova mala opperitur.

Novator maximus tempus: quidni igitur tempus imitemur?

Exempla remota, inepta sunt; recentia, corrupta et ambitiosa.

Imperitis et contentiosis permitte, ut ad exempla res agant.

Sicut qui nobilitatem in familiam introducunt digniores fere sunt posteris; ita novationes rerum plerunque præstant iis quæ ad exempla fiunt.

Morosa morum retentio res turbulenta est, æque ac novitas.

Cum per se res mutentur in deterius, si consilio in melius non mutentur, quis finis erit mali?

Moris servi, temporis ludibria.

Nullus author placet, præter tempus.

Nulla novitas absque injuria; nam præsentia convellit.

Quæ usu obtinuere, si non bona, at saltem apta inter se sunt.

Quis novator tempus imitatur; quod novationes ita insinuat, ut sensus fallant?

Quod præter spem evenit, cui prodest minus acceptum, cui obest magis molestum.

XLI. Mora.

Pro.

Fortuna multa festinanti vendit, quibus morantem donat.

Dum initia rerum amplecti properamus, umbras prensamus.

Fluctuantibus rebus advertendum, inclinantibus agendum.

Prima actionum Argo committenda sunt, extrema Briareo.

Con.

Occasio primum ansam vasis porrigit, deinde ventrem.

Occasio, instar Sibyllæ, minuit oblatum, pretium auget.

Celeritas Orci galea.

Quæ mature fiunt, judicio fiunt; quæ sero, per ambitum.

XLII. Præparatio.

Pro.

Qui parvis copiis rem magnam aggreditur, fingit opportunitatem ut speret.

Parvis apparatibus non fortuna, sed prudentia emitur.

Con.

Optimus terminus parandi, prima occasio agendi.

Nemo speret se fortunam apparatu ligare posse.

Alternatio[1] apparatus et actionis, politica sunt; distinctio, tumida et infœlix.

Magnus apparatus, prodigus et temporis et rerum.

XLIII. Principiis obstare.

Pro.

Plura pericula fallunt, quam vincunt.

Minus operis est periculo remedium adhibere, quam progressum ejus observare et custodire.[2]

Non jam leve est periculum, si leve videatur.

Con.

Docet periculum progredi qui accingitur, et periculum figit remedio.

Etiam in remediis periculorum levia pericula subsistunt.

Præstat cum paucis periculis[3], quæ invaluerunt, rem habere, quam cum minis singulorum.

XLIV. Consilia violenta.

Pro.

Qui lenem istam prudentiam amplectuntur, iis augmenta mali salubria sunt.

Necessitas, quæ violenta consulit, eadem exequitur.

Con.

Omne remedium violentum, prægnans novi mali.

Violenta consilia nemo dat, præter iram et metum.

XLV. Suspicio.

Pro.

Diffidentia nervi prudentiæ;

Con.

Suspicio fidem absolvit.[4]

[1] M. Bouillet proposes to read *alternatio*, by which the sense would be very much improved. [It is *alteratio* in the original. But M. Bouillet's reading is so evidently right that I have introduced it into the text. — *J. S.*]

[2] "If a man watch too long, it is odds he will fall asleep."—*Essays: Of Delays. J. S.*

[3] [*Remediis* in the original edition.] The sense requires *remediis* to be replaced by *periculis*. The word *remediis* appears to have been accidentally repeated from the last sentence. [Or suggested by *rem*, which in the original stands at the end of the line immediately below. — *J. S.*]

[4] "Sospetto licenza fede," is an Italian proverb.

at suspicio medicamentum arthriticum.

Merito ejus fides suspecta est, quam suspicio labefacit.

Suspicio fragilem fidem solvit, fortem intendit.

Suspicionum intemperies est mania quædam civilis.

XLVI. Verba Legis.

Pro.

Non est interpretatio, sed divinatio, quæ recedit a litera.

Cum receditur a litera, judex transit in legislatorem.

Con.

Ex omnibus verbis eliciendus est sensus, qui interpretetur singula.

Péssima tyrannis lex in equuleo.

XLVII. Pro Testibus contra Argumenta.

Pro.

Secundum oratorem non secundum causam pronunciat, qui argumentis nititur.

Qui argumentis potius credit quam testibus, etiam ingenio magis debet fidere quam sensui.

Tutum foret argumentis credere, si homines nihil absurdi facerent.

Argumenta, cum sint contra testimonia, hoc præstant; ut res mira videatur, non autem ut vera.[1]

Con.

Si testibus credendum sit contra argumenta, sufficit tantum judicem esse non surdum.

Argumenta antidotum contra venena testimoniorum.

Iis probationibus tutissimo creditur, quæ rarissime mentiuntur.

Atque hæc Antitheta (quæ nunc proposuimus) fortasse tanti non fuerint; sed cum jam olim parata et collecta a nobis essent, noluimus diligentiæ nostræ juvenilis fructum perire; præsertim cum (si quis acutius introspiciat) *semina* sint, non *flores*. In illo autem adolescentiam plane spirant, quod sint in Morali sive Demonstrativo genere uberiora; in Deliberativo et Judiciali perpauca.

[1] It would seem that the last clause ought to be "non autem ut non vera;" the *res* being the matter in favour of which testimony has been produced.

Tertia Collectio, quæ pertinet ad Promptuariam, atque etiam *desideratur*, est ea quam vocare placet *Formularum Minorum*.[1] Illæ autem sunt veluti vestibula, posticæ, ante-cameræ, recameræ, transitus, &c., orationis; quæ indiscriminatim omnibus subjectis competere possint. Quales sunt Præfationes, Conclusiones, Digressiones, Transitiones, Promissiones, Declinationes, et plurima ejusmodi. Quemadmodum enim in ædificiis plurimum facit et ad voluptatem et ad usum, ut frontispicia, gradus, ostia, fenestræ, aditus, transitus, et hujusmodi, commode distribuantur; eodem modo etiam in oratione fit, ut additamenta et interpositiones istæ (si decore et perite formentur et collocentur) plurimum tum gratiæ tum commoditatis universæ orationis structuræ adjiciant. Harum Formularum exemplum unum aut alterum proponemus, neque diutius iisdem immorabimur. Etsi enim sint res haud exigui usus, tamen cum nihil in his addamus de nostro, sed tantum Formulas nudas ex Demosthene aut Cicerone aut alio quopiam selecto authore describamus, inferius quiddam videntur quam ut in eo tempus teramus.

Exempla *Formularum Minorum*.

Conclusio deliberativæ.

Sic et culpam præteritam fas erit redimere, et futuris incommodis eadem opera prospicere.

Partitionis accuratæ Corollarium.

Ut omnes intelligant nihil me et subterfugere voluisse reticendo, aut obscurare dicendo.[2]

Transitio cum Monito.

Verum hæc ita prætereamus, ut tamen intuentes et respectantes relinquamus.[3]

Præ-occupatio contra opinionem inveteratam.

Faciam ut intelligatis in tota causa quid res ipsa tulerit, quid error affinxerit, quid invidia conflaverit.[4]

[1] The *Promus* already referred to (p. 627.) contains some of these formulæ.

[2] Cicero pro Cluent. c. 1. But the quotation is inaccurate. The original is "nihil me nec subterfugere voluisse reticendo nec obscurare dicendo." It is probable that Bacon intended to write *aut* where *et* now stands.

[3] Id. pro Sext. c. 5. A phrase resembling Dante's

"Non ragioniam di lor, ma guarda e passa."

[4] Id. pro Cluent. c. 4.

Hæc pauca enumerasse, ad exempla satis fuerit; cum quibus Appendices Rhetoricæ, quæ ad Promptuariam spectant, concludimus.

CAPUT IV.

Appendices generales duæ Traditivæ; Critica *et* Pædagogica.

Supersunt duæ appendices Traditivæ in genere; altera Critica, altera Pædagogica. Sicut enim pars Traditivæ præcipua in Scriptione Librorum consistit, ita pars ejus relativa in Librorum versatur Lectione. Lectio autem vel magistrorum ope regitur, vel industria cujusque propria perficitur; atque huic rei inserviunt doctrinæ illæ, quas diximus, duæ.

Ad Criticam spectant primo authorum probatorum limata correctio et emendata editio; quibus et ipsorum authorum honor vindicatur, et studiosis lumen præfertur. Qua tamen in re, studiis haud parum detrimenti intulit quorundam hominum diligentia temeraria. Criticis enim haud paucis mos est, ubi incidunt in quidpiam quod non intelligunt, vitium statim in exemplari supponere; veluti in illo loco Taciti: cum quædam colonia jus asyli apud senatum assereret, narrat Tacitus non æquis admodum auribus quæ ab iis proferebantur fuisse ab imperatore et senatu audita; itaque legati causa diffisi bonam pecuniæ summam Tito Vinio dederunt, ut eis patrocinaretur; hoc itaque pacto res obtinuit. *Tum* (inquit Tacitus) *dignitas et antiquitas coloniæ valuit:* quasi argumenta quæ antea levia videbantur, accedente pretio, novum tum pondus accepissent. At Criticus quidam, non ex infimis, verbum *Tum* expunxit, et *Tantum* reposuit.[1] Atque hac prava Criticorum consuetudine factum est, ut (quod nonnemo prudenter notavit) *exemplaria maxime castigata sint sæpenumero minime omnium casta.* Quinimo, ut verum dicamus, nisi Critici fuerint eruditi in scientiis illis de quibus libri ab ipsis editi tractant, periculo diligentia eorum non vacat.

[1] Justus Lipsius, in his first edition of Tacitus, puts the following note at *tum*, "Fortè tantum;" but he does not alter the text, and in subsequent editions the note is omitted. That Bacon had but an imperfect recollection of the passage, is plain from his substituting the name of Titus Vinius for that of Fabius Valens, and from his mentioning the senate, as if the transaction had taken place at Rome. It was by a donative to the soldiery that the colony of Vienna was saved, not (directly at least) by a bribe to their leader; though Tacitus adds that it was believed that he also had been bought over, — "ipsum Valentem magnâ pecuniâ emptum." — *Hist.* i. 66.

Secundo ad Criticam spectant authorum interpretatio et explicatio, commentarii, scholia, notæ, spicilegia, et similia. In istiusmodi autem laboribus pessimus ille Criticorum nonnullos quasi morbus invasit, ut multa ex obscurioribus transiliant, in satis vero perspicuis ad fastidium usque immorentur et expatientur. Scilicet non tam illud agitur ut author ipse illustretur, quam ut Criticus ille multiplicem suam eruditionem et variam lectionem, ubique arrepta occasione, ostentet. Optandum inprimis foret (licet hæc res ad Traditivam principalem, non ad Appendices pertineat) ut qui argumenta obscuriora et nobiliora pertractet scriptor, suas ipse explicationes subjungat; ut et textus ipse digressionibus aut explicationibus non abrumpatur, et notæ a scriptoris mente non recedant. Cujusmodi quidpiam suspicamur de Theone Euclidis.[1]

Tertio ad Criticam spectat (quod etiam nomen eidem indidit) de authoribus quos edunt breve aliquod judicium interponere; et illos cum cæteris scriptoribus qui eadem tractant comparare; ut per hujusmodi censuram studiosi et de librorum delectu moneantur, et ad ipsam lectionem eorum instructiores accedant. Atque hoc ultimum est Criticorum tanquam cathedra, quam certe nostra ætate nobilitarunt viri nonnulli magni, majores certe nostro judicio quam pro modulo Criticorum.

Ad Pædagogicam quod attinet, brevissimum foret dictu, *Consule scholas Jesuitarum:* nihil enim, quod in usum venit, his melius. Nos tamen pauca more nostro monebimus, tanquam spicas legentes. Omnino institutionem pueritiæ et juventutis collegiatam probamus; non in ædibus privatis; non sub ludi-magistris tantum. Adest adolescentulis in Collegiis æmulatio major erga æquales; adest quoque ipse vultus et aspectus virorum gravium, quod facit ad verecundiam, et teneros animos etiam a principio conformat ad exemplar; denique sunt quidem plurima Educationis Collegiatæ commoda. In Ordine autem et Modo disciplinæ, illud inprimis consuluerim; ut caveatur a *compendiis* et a *præcocitate quadam doctrinæ*, quæ ingenia reddat audacula, et magnos profectus potius ostentet quam faciat. Quin et favendum nonnihil *ingeniorum libertati*, ut si quis quæ ex more disciplinæ sunt faciat, et simul tempus ad alia in quæ

[1] It seems probable that this remark, showing a kind of reading with which Bacon does not seem to have been familiar (vide suprà p. 577.), was derived from his friend Sir Henry Savile. We find Theon's services in relation to Euclid's *Elements* depreciatingly spoken of in Savile's *Prælectiones tresdecim in Principium Elementorum Euclidis* (1621), pp. 12, 13.

propensus est suffuretur, ne utique cohibeatur. Porro operæ pretium fuerit diligenter animadvertere (quod fortasse adhuc non fuerit notatum) esse duos assuefaciendi et exercendi et præparandi ingenia modos, eosque tanquam antistrophos. Alter *incipit a facilioribus*, et ad magis ardua paulatim deducit; alter *ab initio duriora imperat et urget*, ut iis obtentis, facilioribus quis etiam suaviter perfungi possit. Alia enim est methodus, incipere natare cum utribus, qui sublevent; alia incipere saltare cum calceis ponderosis, qui aggravent. Neque facile est dictu, quantum harum methodorum prudens intermixtio conferat ad promovendas tam animi quam corporis facultates. Item *applicatio et delectus studiorum*, pro natura ingeniorum quæ erudiuntur, res est singularis et usus et judicii; quam etiam bene et vere notatam et perspectam magistri parentibus adolescentium debent; ut de genere vitæ, cui filios suos destinent, consulere possent. Verum et illud attentius paulo observandum; non tantum in iis ad quæ natura quisque sua fertur longe maximos fieri profectus; sed etiam ad ea ad quæ vitio naturæ quis maxime fuerit inhabilis, reperiri in studiis ad hoc proprie delectis remedia et curationes. Exempli gratia; si cuipiam ingenium tale sit quale est avium, ut facile abripiatur, nec per moram (qualem oportet) intentum esse sustineat; remedium huic rei præbebunt Mathematica, in quibus si evagetur paulo mens, de integro renovanda est demonstratio. Etiam *exercitiorum*, in erudiendo, partes liquet esse vel maximas. At illud a paucis notatum est, quod exercitiorum debeat esse non solum prudens institutio, sed etiam prudens intermissio. Optime siquidem Cicero notavit, *quod in exercitiis plerumque exerceri contingat non minus vitia quam facultates*[1], adeo ut malus habitus quandoque simul acquiratur et se insinuet cum bono. Itaque tutius est intermittere exercitia, et subinde repetere, quam assidue continuare et urgere. Verum de his satis. Sunt certe hæ res primo aspectu minus grandes et solennes, sed fructuosæ tamen et efficaces. Quemadmodum enim in plantis ad fœlicitatem vel infœlicitatem ipsarum plurimum faciunt injuriæ aut auxilia quæ iisdem cum teneræ fuissent intervenerint; quemadmodum etiam incrementa illa immensa Imperii Romani merito a quibusdam attribuuntur virtuti et prudentiæ sex il-

[1] Cicer. de Orator. i. 33. [Compare the Essay on *Nature in Men*: —"Let not a man force a habit upon himself with a perpetual continuance, but with some intermission. For both the pause reinforceth the new onset: and, if a man that is not perfect be ever in practice, he shall as well practise his errors as his abilities, and induce one habit of both." — *J. S.*]

lorum Regum, qui eidem in pueritia sua veluti tutores fuerunt aut nutritii[1]: sic certe cultura et institutio annorum puerilium aut teneriorum eas habet vires, licet latentes et minime in cujusvis observationem incurrentes, quas neque temporis diuturnitas neque laborum assiduitas et contentio postea ætate maturiore possint ullo modo æquiparare. Non abs re fuerit etiam notare, facultates vel mediocres, si in magnos viros aut res magnas inciderint, graves et insignes interdum producere effectus. Ejus rei ponemus exemplum memorabile; quod eo magis adducimus, quia Jesuitæ eandem disciplinam non videntur aspernari; sano (ut nobis videtur) judicio. Atque est res, quæ si sit professoria, infamis est; verum disciplinaria facta, ex optimis est. Intelligimus autem *Actionem Theatralem;* quippe quæ memoriam roborat; vocis et pronunciationis tonum atque efficaciam temperat; vultum et gestum ad decorum componit; fiduciam non parvam conciliat; denique oculis hominum juvenes assuefacit. Erit autem exemplum, e Tacito desumptum, Vibuleni cujusdam, olim histrionis, tunc temporis autem militantis in legionibus Pannonicis. Ille sub excessu Augusti seditionem moverat, ita ut Blæsus præfectus aliquos ex seditiosis in carcerem conjiceret. Milites vero, impressione facta, illos effractis carceribus liberarunt. At Vibulenus, apud milites concionabundus, sic orsus est; *Vos* (*inquit*) *his innocentibus et miserrimis lucem et spiritum reddidistis; sed quis fratri meo vitam, quis fratrem mihi reddit? quem missum ad vos a Germanico exercitu de communibus commodis nocte proxima jugulavit per gladiatores suos, quos in exitium militum habet atque armat. Responde, Blæse, ubi cadaver abjeceris? Ne hostes quidem sepulturam invident. Cum oculis, cum lachrymis dolorem meum implevero, me quoque trucidari jube; dum interfectos, nullum ob scelus, sed quia utilitati legionum consulebamus, hi sepeliant.*[2] Quibus verbis invidiæ ac consternationis nimium quantum concivit; adeo ut nisi brevi postea innotuisset nihil horum fuisse, quinetiam fratrem eum nunquam habuisse, vix a præfecto milites manus abstinuissent; ille vero rem totam tanquam fabulam in scena peregit.

Nunc vero ad colophonem pervenimus tractatus nostri de Doctrinis Rationalibus. In quibus, licet a partitionibus receptis interdum recesserimus, nemo tamen existimet nos illas

[1] See Macchiavelli, Discorsi [i. 19.].

[2] Tacit. Ann. i. 16—22.

omnes improbare partitiones quibus usi non sumus. Duplex enim nobis imponitur necessitas partitiones mutandi. Una, quia hæc duo, nimirum res natura proximas in unam classem redigere, et res ad usum promendas conjicere in unum cumulum, fine ipso et intentione sunt omnino diversa. Exempli gratia; secretarius aliquis regis aut reipublicæ, in musæo chartas suas ita proculdubio distribuit, ut quæ similis sint naturæ simul componat; veluti fœdera seorsum, seorsum mandata, literas ab exteris, literas domesticas, et similia, seorsum omnia: contra, in scrinio aliquo particulari illas simul componit, quas, licet diversi generis sunt, simul tamen usui fore existimet. Sic nimirum, in hoc universali scientiæ repositorio, nobis pro natura rerum ipsarum partitiones erant instituendæ; cum tamen, si particularis aliqua scientia fuisset pertractanda, partitiones fuissemus secuti usui et praxi potius accommodatas. Altera necessitas partitiones mutandi est, quia Desideratorum ad scientias adjectio, et eorum cum reliquis in integrum corpus redactio, etiam, per consequentiam, scientiarum ipsarum partitiones transtulit. Nam (demonstrationis gratia), esto quod artes quæ habentur rationem habeant numeri 15, adjectis autem Desideratis numeri 20. Dico quod partes numeri 15, non sunt eædem partes quæ numeri 20. Nam partes numeri 15, sunt 3 et 5; partes vero numeri 20 sunt 2, 4, 5, et 10. Itaque patet, quod hæc aliter fieri non potuerint. Atque de *Scientiis Logicis* hæc dicta sint.

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DE DIGNITATE ET AUGMENTIS SCIENTIARUM

LIBER SEPTIMUS.

AD REGEM SUUM.

CAPUT I.

Partitio Ethicæ in Doctrinam de Exemplari, *et* Georgica Animi. *Partitio Exemplaris* (*scilicet Boni*) *in* Bonum Simplex, *et* Bonum Comparatum. *Partitio Boni Simplicis in Bonum* Individuale, *et Bonum* Communionis.

PERVENTUM est (Rex optime) ad Ethicam, quæ Voluntatem Humanam intuetur et tractat. Voluntatem gubernat recta ratio, seducit bonum apparens. Voluntatis stimuli, affectus; ministri, organa et motus voluntarii. De hac Salomon, *Ante omnia* (inquit) *custodi, Fili, cor tuum; nam inde procedunt actiones vitæ.*[1] In hujus Scientiæ pertractatione, qui de ea scripserunt perinde mihi fecisse videntur, ac si quis scribendi artem tradere pollicitus pulchra tantum exhibeat *exemplaria* literarum, tam simplicium quam copulatarum; de *calamo* vero *ducendo* aut modis characteres efformandi nihil præcipiat. Ita et isti proposuerunt nobis exemplaria bella et luculenta atque descriptiones sive imagines accuratas Boni, Virtutis, Officiorum, Fœlicitatis, tanquam vera objecta et scopos voluntatis et appetitus humani; verum quomodo quis possit optime ad hos scopos (excellentes sane et bene ab illis positos) collimare; hoc est, quibus rationibus et institutis animus ad illa assequenda subigi

[1] Prov. iv. 23.

et componi possit; aut nihil præcipiunt, aut perfunctorie et minus utiliter. Disseramus quantum libuerit virtutes morales in animo humano esse habitualiter, non naturaliter[1]; distinguamus solenniter inter spiritus generosos et vulgus ignobile, quod illi rationum momentis, hi præmio aut pœna ducantur; præcipiamus ingeniose animum humanum, ut rectificetur, instar bacilli in contrariam partem inclinationis suæ flecti oportere[2]; aliaque insuper hujusmodi hinc inde spargamus; longe tamen abest, ut hæc et alia id genus absentiam rei excusent quam modo requirimus.

Hujusce neglectus causam haud aliam esse reor quam latentem illum scopulum, ad quem tot Scientiæ naviculæ impingentes naufragia passæ sunt; nimirum quod fastidiant scriptores versari in rebus vulgatis et plebeiis, quæ nec satis subtiles sint ad disputandum, nec satis illustres ad ornandum. Sane haud facile quis verbis assequatur, quantam calamitatem attulerit hoc ipsum quod dicimus; quod homines ingenita superbia et gloria vana eas materias tractationum eosque modos tractandi sibi delegerint, quæ ingenia ipsorum potius commendent quam lectorum utilitatibus inserviant. Optime Seneca, *Nocet illis eloquentia, quibus non rerum facit cupiditatem, sed sui*[3]; siquidem scripta talia esse debent ut amores documentorum ipsorum, non doctorum, excitent. Ii igitur recta incedunt via, qui de consiliis suis id prædicare possint quod fecit Demosthenes, atque hac clausula ea concludere; *Quæ si feceritis, non oratorem duntaxat in præsentia laudabitis, sed vosmetipsos etiam non ita multo post statu rerum vestrarum meliore.*[4] Ego certe (Rex optime), ut de meipso quod res est loquar, et in iis quæ nunc edo et in iis quæ in posterum meditor dignitatem ingenii et nominis mei (si qua sit) sæpius sciens et volens projicio, dum commodis humanis inserviam; quique architectus fortasse in philosophia

[1] Bacon refers to the Aristotelian definition of virtue, ἕξις πρακτικὴ τοῦ δέοντος, which St. Thomas Aquinas thus illustrates — "Sunt autem quædam potentiæ quæ secundum seipsas sunt determinatæ ad suos actus" (that is, naturaliter) "sicut potentiæ naturales activæ, et ideo hujusmodi potentiæ naturales secundum seipsas dicuntur virtutes, potentiæ autem rationales quæ sunt propriæ hominis non sunt determinatæ ad unum, sed se habent indeterminate ad multa, determinantur autem ad actus per habitum, et ideo virtutes humanæ habitus sunt."— *Sum. Theol.* i. 2^dae 45. 1.

[2] Arist. Eth. ad Nicom. ii. 9.

[3] Ep. 52. sub fin.: —"Ad rem commoveantur, non ad verba composita. Alioqui nocet illis eloquentia, si non rerum cupiditatem facit, sed sui." Seneca is speaking of the auditors of popular lecturers on philosophy. The only kind of applause which he would allow the lecturer to affect or the audience to bestow, is that of young men so stirred by the matter that they cannot refrain. — *J. S.*

[4] Demosth. Olynth. ii. ad calc.

et scientiis esse debeam, etiam operarius et bajulus et quidvis demum fio; cum haud pauca, quæ omnino fieri necesse sit, alii autem ob innatam superbiam subterfugiant, ipse sustineam et exequar. Verum (ut ad rem redeamus) quod cœpimus dicere, delegerunt sibi philosophi in Ethica massam quandam materiæ splendidam et nitentem, in qua potissimum vel ingenii acumen vel eloquentiæ vigorem venditare possint. Quæ vero practicam maxime instruunt, quandoquidem tam belle ornari non possint, maxima ex parte omiserunt.

Neque tamen debuerant viri tam eximii desperasse de fortuna simili ei quam poëta Virgilius et sibi spondere ausus et revera consequutus est; qui non minorem eloquentiæ, ingenii, et eruditionis gloriam adeptus est in explicando observationes agriculturæ, quam Æneæ res gestas heroicas enarrando.

> Nec sum animi dubius, verbis ea vincere magnum
> Quam sit, et angustis his addere rebus honorem.[1]

Certe si serio hominibus cordi sit, non in otio scribere quæ per otium legantur, sed revera vitam activam instruere et subornare, Georgica ista Animi Humani non minore in pretio apud homines haberi debeant, quam heroicæ illæ effigies Virtutis, Boni, et Fœlicitatis, in quibus tam operose est insudatum.

Partiemur igitur Ethicam in doctrinas principales duas; alteram de Exemplari sive Imagine Boni; alteram de Regimine et Cultura Animi, quam etiam partem *Georgica Animi* appellare consuevimus. Illa Naturam Boni describit, hæc Regulas de animo ad illam conformando præscribit.

Doctrina de Exemplari (quæ Boni Naturam intuetur et describit) Bonum considerat aut Simplex, aut Comparatum; aut Genera (inquam) Boni, aut Gradus. In posteriore horum, disputationes illas infinitas et speculationes circa Boni Supremum Gradum, quem Fœlicitatem, Beatitudinem, Summum Bonum vocitarunt, (quæ ethnicis instar theologiæ erant) Christiana tandem fides sustulit, et missas fecit. Quemadmodum enim Aristoteles ait, *Adolescentes posse etiam beatos esse, sed non aliter quam spe*[2]; eodem modo, a Christiana fide edocti, debemus nos omnes minorum et adolescentum loco statuere, ut non aliam fœlicitatem cogitemus quam quæ in spe sita est.

Liberati igitur (bonis avibus) ab hac Doctrina, tanquam de

[1] Georg. iii. 289.

[2] Aristot. Eth. ad Nicom. i. 10.

cœlo ethnicorum, (qua in parte proculdubio elevationem naturæ humanæ attribuerunt majorem quam cujus illa esset capax; videmus enim quali cothurno Seneca, *Vere magnum habere fragilitatem hominis, securitatem Dei*[1]) reliqua certe ab illis circa Doctrinam Exemplaris tradita, minore aut veritatis aut sobrietatis jactura, magna ex parte recipere possumus. Etenim quod ad Naturam Boni Positivi et Simplicis spectat, illam certe pulcherrime et ad vivum veluti in tabulis eximiis depinxerunt; virtutum et officiorum figuras, posituras, genera, affinitates, partes, subjecta, provincias, actiones, dispensationes, diligentissime sub oculos repræsentantes. Neque hic finis; nam hæc omnia animo humano, magno quoque argumentorum acumine et vivacitate et suasionum dulcedine, commendarunt atque insinuarunt. Quinetiam (quantum verbis præstari possit) eadem contra pravos et populares errores et insultus fidelissime muniverunt. Quatenus vero ad Naturam Boni Comparati, huic rei etiam nullo modo defuerunt; in constituendis trinis illis Ordinibus Bonorum[2]; in collatione Vitæ Contemplativæ cum Activa[3]; in discriminatione Virtutis cum Reluctatione et Virtutis jam Securitatem nactæ et confirmatæ; in conflictu et pugna Honesti et Utilis; in Virtutum inter se Libramine, nimirum cui quæque præponderet; et similibus. Adeo ut hanc partem de Exemplari insigniter excultam jam esse, et antiquos in ea re mirabiles se viros præstitisse, reperiam; ita tamen, ut philosophos longo post se intervallo reliquerit pia et strenua theologorum diligentia, in Officiis et Virtutibus Moralibus et Casibus Conscientiæ et Peccati Circumscriptionibus pensitandis et determinandis exercitata.[4]

Nihilo secius (ut ad Philosophos redeamus) si illi (antequam ad populares et receptas notiones Virtutis, Vitii, Doloris, Voluptatis, et cæterorum se applicassent) supersedissent paulisper, et radices ipsas Boni et Mali et radicum illarum fibras indagassent; ingentem meo judicio lucem illis omnibus quæ postea in inquisitionem ventura fuissent, affudissent; ante omnia, si Naturam Rerum non minus quam Axiomata Moralia consuluis-

[1] "Ecce res magna, habere imbecillitatem hominis, securitatem Dei." — *Senec. Ep.* 53.

[2] Namely, the good which relates respectively to mind, body, and estate. See *Arist. Eth. ad Nicom.* i. 8. 2.

[3] Arist. Eth. ad Nicom. x. 7.

[4] The aggregate of these inquiries constitutes what was called moral theology, which in the later developments of scholasticism was treated apart from the rest of the subjects contained in a "Summa Theologiæ."

sent, doctrinas suas minus prolixas, magis autem profundas reddidissent. Quod cum ab illis aut omnino omissum aut confuse admodum tractatum fuerit, nos breviter retractabimus, et Fontes ipsos Rerum Moralium aperire et purgare conabimur; antequam ad Doctrinam de Cultura Animi, quam ponimus ut Desideratam, perveniamus. Hoc enim (ut arbitramur) Doctrinam de Exemplari novis quodammodo viribus donabit.

Inditus est atque impressus unicuique rei appetitus ad duplicem Naturam Boni: alteram, qua res Totum quiddam est in seipsa; alteram, qua est Pars Totius alicujus Majoris. Atque posterior hæc illa altera dignior est et potentior; cum tendat ad conservationem Formæ Amplioris. Nominetur prima *Bonum Individuale,* sive *Suitatis;* posterior *Bonum Communionis.* Ferrum sympathia particulari fertur ad magnetem; at si paulo ponderosius fuerit, amores illos deserit, et tanquam bonus civis et amator patriæ Terram petit; regionem scilicet connaturalium suorum. Ulterius paulo pergamus: Corpora densa et gravia terram petunt, congregationem magnam corporum densorum; attamen, potius quam natura rerum divulsionem patiatur, et detur (ut loquuntur) Vacuum, corpora hujusmodi in sursum ferentur, et cessabunt ab officio suo erga Terram, ut præstent officium suum Mundo ipsi debitum. Ita quasi perpetuo obtinet, ut conservatio Formæ magis Communis minores appetitus in ordinem redigat. At prærogativa ista Boni Communionis signatur præcipue in homine, si non degeneraverit; juxta memorabile illud Pompeii Magni dictum; qui, quo tempore Romam fames premeret, annonæ importandæ præpositus, vehementissime autem ab amicis interpellatus ne mari atroce tempestate ingruente se committeret, illud tantum respondit; *Necesse est ut eam, non ut vivam*[1]; adeo ut vitæ desiderium (quod in individuo maximum est) amore et fide in rempublicam apud eum non præponderaret. Sed quid moramur? Nulla omnibus sæculis reperta est vel philosophia vel secta vel religio vel lex aut disciplina, quæ in tantum Communionis Bonum exaltavit, Bonum vero Individuale depressit, quantum Sancta Fides Christiana; unde liquido pateat unum eundemque Deum fuisse, qui creaturis leges illas Naturæ, hominibus vero legem Christianam dedisset. Propterea legimus nonnullos ex electis et sanctis viris optasse se potius erasos ex Libro Vitæ, quam ut

[1] πλεῖν ἀνάγκη, ζῆν οὐκ ἀνάγκη. — *Plut. in Pomp.* c. 50.

salus ad fratres suos non perveniret; ecstasi quadam charitatis et impotenti desiderio Boni Communionis incitati.[1]

Hoc positum, ita ut immotum maneat et inconcussum, nonnullis ex gravissimis in Morali Philosophia controversiis finem imponit. Primo enim quæstionem illam determinat, de *Vita Contemplativa Activæ præferenda;* idque contra sententiam Aristotelis. Omnes siquidem rationes, quæ ab illo pro Contemplativa afferuntur, Bonum Privatum respiciunt, atque Individui tantum ipsius voluptatem aut dignitatem; quibus in rebus Contemplativa palmam haud dubie reportat. Etenim Contemplativa non absimilis est comparationi qua usus est Pythagoras, ut philosophiæ et contemplationi honorem ac decus assereret. Qui ab Hierone, quisnam esset, interrogatus, respondit; *Hieronem non latere (si forte unquam Olympicis certaminibus interfuisset) id ibi loci contingere, ut veniant eo alii fortunæ suæ in agonibus periculum facturi; alii vero ut mercatores, ad merces distrahendas; alii ut amicos undique confluentes convenirent, et epulis ac hilaritati indulgerent; alii denique ut cæterorum essent spectatores; se autem unum esse ex illis, qui spectandi gratia venerit.*[2] Verum homines nosse debent, in hoc humanæ vitæ theatro, Deo et Angelis solum convenire ut spectatores sint.[3] Neque sane fieri potuit, ut hac de re dubitatio in ecclesia unquam suscitaretur (utcunque plurimis in ore fuerit dictum illud, *pretiosa in oculis Domini mors sanctorum ejus*[4]; ex quo loco mortem illam civilem, et instituta vitæ monasticæ et regularis attollere soleant); nisi illud etiam una subesset, quod vita illa monastica mere contemplativa non sit, verum plane in officiis ecclesiasticis versetur; qualia sunt jugis

[1] In [the *Cogitationes de Scientia Humana*, an early fragment which will be printed in Part III. of this edition from a MS. in the British Museum], Moses and St. Paul are expressly mentioned in a passage of which the purport is the same as that of the text. See Exodus, xxxii. 32., and Romans, ix. 3. Bacon here touches on what theologians call the conditional sacrifice of salvation — a matter frequently referred to in the unhappy controversy between Bossuet and Fenelon. The 33rd of the Articles of Issy, which they both signed, sanctions the notion of this conditional sacrifice. It appears, however, that the article in question was one of the four added at Fenelon's suggestion to Bossuet's original draft, and that the latter did not consent without reluctance to its introduction. Fenelon's own views on the subject are developed in his *Instruction Pastorale*, &c., sec. 10., and elsewhere. St. Chrysostom, according to a passage quoted by Fenelon, disapproved greatly of those who held that St. Paul speaks merely of temporal death.

[2] "Hiero" is a mistake for Leo (tyrant of Phliuns). The story of the interview between him and Pythagoras is told by Cicero, *Tusc. Quæst.* v. 3. Compare Iamblichus's Life of Pythagoras, in which, though the same sentiment is ascribed to him, it is not put in a dramatic form.

[3] Compare St. Augustin, speaking of St. Paul, *De Civ. Dei*, xiv. 9.

[4] Psalm cxvi. 15.

oratio, et votorum sacrificia Deo oblata, librorum item theologicorum multo in otio conscriptio ad legis divinæ doctrinam propagandam; quemadmodum et Moses fecit, cum per tot dies in montis secessu moratus esset. Quinetiam Henoch, ab Adamo septimus, qui videtur fuisse princeps Vitæ Contemplativæ (etenim *cum Deo ambulasse* perhibetur)[1], nihilominus ecclesiam Prophetiæ Libro (qui etiam a Sancto Juda citatur) dotavit.[2] Contemplativam vero quod attinet meram, et in seipsa terminatam, quæque radios nullos sive caloris sive luminis in societatem humanam diffundat; nescit eam certe Theologia.

Determinat etiam quæstionem, tanta contentione agitatam, inter scholas Zenonis et Socratis ex una parte, qui fœlicitatem in virtute, aut sola aut adornata, (cujus semper in officiis vitæ partes potissimæ) collocarunt, et reliquas complures sectas et scholas ex altera parte; veluti scholas Cyrenaïcorum et Epicureorum, qui eam in voluptate constituerunt, virtutem autem (sicut fit in comœdiis aliquibus, ubi hera cum famula vestem mutet) plane ancillam statuerunt, utpote sine qua voluptati commode ministrari non posset; nec minus illam alteram Epicuri scholam, quasi Reformatam, quæ fœlicitatem nihil aliud esse prædicabat quam animi tranquillitatem et serenitatem, a perturbationibus liberi et vacui; ac si Jovem de solio deturbare vellent et Saturnum cum aureo sæculo reducere, quando neque æstas nec bruma fuissent, non ver nec autumnus, sed una et æquabilis aëris temperies; denique et illam explosam Pyrrhonis et Herilli scholam, qui sitam autumaverunt fœlicitatem in scrupulis quibusque animi prorsus eliminandis; nullam statuentes fixam et constantem boni aut mali naturam; sed actiones pro bonis aut malis habentes, prout ex animo, motu puro et irrefracto aut contra cum aversatione et reluctatione, prodirent; quæ tamen opinio in hæresi Anabaptistarum revixit; qui cuncta metiebantur juxta motus et instinctus spiritus, et constantiam vel vacillationem fidei. Liquet autem ista quæ recensuimus omnia ad privatam animorum tranquillitatem et complacentiam, nullo modo autem ad Bonum Communionis, spectare.

[1] Gen. v. 24.

[2] St. Jude, 14. Three MS. copies of the Ethiopic version of the book of Enoch were brought from Abyssinia by Bruce. Dr. Lawrence published an English translation of it, which I have not seen. A German translation by Hoffman appeared at Jena in 1833. Before Bruce's time, the contents of this apocryphal or uncanonical book were, at least in Europe, wholly unknown.

Porro redarguit etiam Philosophiam Epicteti, qui hoc utitur præsupposito; fœlicitatem in iis poni debere quæ in potestate nostra sunt; ne scilicet fortunæ et casibus simus obnoxii[1]; quasi vero non multo fuerit fœlicius in rectis et generosis intentionibus et finibus, qui publicum bonum amplectantur, successu destitui et frustrari, quam in omnibus quæ ad privatam tantum fortunam nostram referuntur voti perpetuo compotes fieri. Sicut Consalvus, Neapolim digito militibus indicans, generosa voce testatus est, *Multo sibi optatius fore, unum pedem promovendo, ad interitum certum ruere; quam unius pedis recessu, vitam in multos annos producere.*[2] Cui etiam concinit Cœlestis Dux et Imperator, qui pronunciavit *Conscientiam bonam juge esse convivium*[3]; quibus verbis aperte significat, mentem bonarum intentionum sibi consciam, utcunque successu careat, verius et purius et naturæ magis consentaneum præbere gaudium, quam universum illum apparatum quo instrui possit homo, vel ut desideriis suis fruatur vel ut animo conquiescat.

Redarguit itidem philosophiæ abusum illum, circa Epicteti tempora grassari cœptum: nempe quod philosophia versa fuerit in genus quoddam vitæ professorium, et tanquam in artem; quasi scilicet institutum philosophiæ esset, non ut perturbationes compescerentur et extinguerentur, sed ut causæ et occasiones ipsarum evitarentur et summoverentur; ideoque particularis quædam vitæ ratio ad hoc obtinendum ineunda esset; introducendo sane tale genus sanitatis in animum, quale fuit

[1] The moral philosophy of the Stoics is misunderstood when it is said that they placed happiness in that which is in the wise man's power, in order that he may be happy. They set out from the inquiry, "What is the end and purpose, the summum bonum, of man's life?" in which is involved the assumption that it *has* an end and purpose, and that this is in its own nature attainable. And this assumption may be developed into an answer to the inquiry in which it is involved. For as the wise man, who is the representative of humanity in its best estate, must be capable of attaining the true end of his being, they concluded that whatever might in virtue of outward circumstances be to him unattainable, must be, with reference to that end, a thing indifferent; or, in other words, that the summum bonum must be looked for in that which is in his own power. That felicity in this sense is always in the wise man's power is thus not an arbitrary assertion, but results from the principle that life is not merely a purposeless dream.

[2] "Desiderare piuttosto di avere al presente la sua sepoltura un palmo di terreno più avanti, che col ritirarsi indietro poche braccie allungare la vita cento anni." — *Guicciard.* vi. 2.

Fernandez Consalvo of Cordova commonly called the Great Captain, and certainly one of the most successful soldiers of the age in which he lived, was employed by the King of Spain in his Italian wars. He died at [Granada] in [December, 1515]. See, for the testimony to his merits of apparently an unwilling witness, Brantôme's *Vies des Grands Capitaines*, and for a panegyrical biography, Paulus Jovius.

[3] "He that is of a merry heart hath a continual feast." — *Proverbs*, xv. 15., where the Vulgate is "Secura mens quasi juge convivium."

Herodici in corpore, cujus meminit Aristoteles[1]; illum scilicet nihil aliud per totam vitam egisse quam ut valetudinem curaret, et proinde ab infinitis rebus abstineret, corporis interim usu quasi multatus; ubi si hominibus officia societatis consectari cordi sit, illa demum valetudo maxime est expetenda quæ quaslibet mutationes et impetus quoscunque ferre et vincere queat. Eodem modo et animus ille demum vere et proprie sanus et validus censendus est, qui per plurimas et maximas tentationes et perturbationes perrumpere potest. Ita ut optime Diogenes dixisse visus sit, qui eas vires animi laudarit *quæ non ad caute abstinendum sed ad fortiter sustinendum valerent*[2]; quæque animi impetum etiam in maximis præcipitiis cohibere possint; quæque (id quod in equis bene subactis laudatur) præstent ut brevissimo spatio et sistere se et vertere possint.

Postremo, redarguit idem teneritudinem quandam et ineptitudinem ad morigerandum, in nonnullis ex antiquissimis philosophis et maxime in veneratione habitis notatam; qui nimis facile se a rebus civilibus subduxerint, ut indignitatibus et perturbationibus se exuerent, atque magis, sua opinione, illibati et tanquam sacrosancti viverent; ubi consentaneum esset, constantiam hominis vere moralis talem fore, qualem idem Consalvus in homine militari requirebat; nimirum ut honor ejus contexeretur tanquam *e tela crassiore;* minimeque tam tenui ut quidvis illud vellicare et lacerare possit.

[1] Rhet. i. 5. 10. A similar account is given of Herodicus in the third book of Plato's *Republic.* In illustration of the assertion that philosophy came to be a "professorium vitæ genus," see Aulus Gellius, ix. 2. and elsewhere.

[2] *τὸ κρατεῖν καὶ μὴ ἡττᾶσθαι ἡδόνων ἀριστὸν, οὐ τὸ μὴ χρῆσθαι.* But this was not said by Diogenes, but by Aristippus. See Diog. Laert. in Aristip. Bacon has elsewhere (v. sup. p. 449.) confounded these two names. The error in both cases may perhaps have arisen from a wrong entry in a commonplace book. The inaccuracy in the present passage is the more remarkable as the most celebrated of Aristippus's sayings occurs in immediate juxta-position with the words I have quoted from Diogenes Laertius.

[I should rather think that Bacon alludes to the following saying of Diogenes, which is also in Diogenes Laertius: *ἐπῄνει τοὺς μέλλοντας γαμεῖν καὶ μὴ γαμεῖν· καὶ τοὺς μέλλοντας πλεῖν καὶ μὴ καταπλεῖν· τοὺς μελλόντας πολιτεύεσθαι καὶ μὴ πολιτεύεσθαι· καὶ τοὺς παιδοτροφεῖν μέλλοντας καὶ μὴ παιδοτροφεῖν· καὶ τοὺς παρασκευαζομένους συμβιοῦν τοῖς δυνάσταις καὶ μὴ προσίοντας*: meaning that he admired the man, not who was without passions, but who could command them. — *J. S.*]

CAPUT II.

Partitio Boni Individualis, vel Suitatis, in Bonum Activum, *et* Bonum Passivum. *Partitio Boni Passivi in Bonum* Conservativum, *et Bonum* Perfectivum. *Partitio Boni Communionis in* Officia Generalia, *et* Respectiva.

Repetamus igitur jam et persequamur primum Bonum Individuale, et Suitatis. Illud partiemur in Bonum Activum, et Bonum Passivum. Etenim hæc quoque differentia Boni (non absimilis certe illis appellationibus quæ Romanis in Œconomicis erant familiares, *Promi* scilicet et *Condi*) in universa rerum natura impressa reperitur; præcipue autem se prodit in duplici rerum creatarum appetitu; altero se Conservandi et Muniendi, altero se Multiplicandi et Propagandi. Atque hic posterior, qui Activus est et veluti *Promus*, potentior videtur et dignior; ille autem prior, qui Passivus est et veluti *Condus*, inferior censeri potest. Etenim in universitate rerum natura cœlestis præcipue Agens est, at natura terrestris Patiens. Etiam in delectationibus animantium major voluptas est generandi, quam pascendi. In oraculis quoque divinis pronunciatur *Beatius esse dare, quam accipere.*[1] Quin et in vita communi nemo invenitur ingenio tam molli et effœminato, quin pluris faciat, aliquid quod ei in votis erat perficere et ad exitum perducere, quam sensualitatem aliquam aut delectamentum. Atque ista quidem Boni Activi præeminentia in immensum exaltatur ex intuitu conditionis humanæ, quod sit et mortalis et fortunæ ictibus exposita. Nam si in voluptatibus hominum posset obtineri perpetuitas atque certitudo, magnum pretium eis accederet propter securitatem et moram.[2] Quandoquidem autem videmus huc rem recidere, *Magni æstimamus mori tardius*[3]; et *Ne glorieris de crastino; nescis partum diei*[4]; mirum minime est, si omni contentione feramur ad ea quæ temporis

[1] Acts, xx. 35.

[2] Compare Homer's noble lines: —

ὦ πέπον, εἰ μὲν γὰρ πόλεμον περὶ τόνδε φυγόντες
αἰεὶ δὴ μέλλοιμεν ἀγήρω τ' ἀθανάτω τε
ἔσσεσθ', οὔτε κεν αὐτὸς ἐνὶ πρώτοισι μαχοίμην
οὔτε κέ σε στέλλοιμι μάχην ἐς κυδιάνειραν·
νῦν δ', ἔμπης γὰρ κῆρες ἐφεστᾶσιν θανάτοιο
μυρίαι, ἃς οὐκ ἔστι φυγεῖν βροτὸν οὐδ' ὑπαλύξαι,
ἴομεν· ἠέ τῳ εὖχος ὀρέξομεν ἠέ τις ἡμῖν. Il. μ. 322.

[3] Seneca, Nat. Quæst. ii. 59.

[4] Proverbs, xxvii. 1.

injurias non reformident. Ea vero nulla esse possunt, præter opera nostra; sicut dicitur, *Opera eorum sequuntur eos.*[1] Est et altera præeminentia Boni Activi haud exigua, et indita et sustentata ex eo affectu qui humanæ naturæ, ut comes individuus, lateri adhæret; amor scilicet novitatis aut varietatis. Ille vero in sensuum voluptatibus (quæ Boni Passivi pars sunt vel maxima) angustus admodum est, nec latitudinem habet aliquam insignem: *Cogita quamdiu eadem feceris; cibus, somnus, ludus; per hunc circulum curritur; mori velle non tantum fortis, aut miser, aut prudens, sed etiam fastidiosus potest.*[2] At in actis vitæ nostræ et institutis et ambitionibus insignis est varietas; eaque multa cum voluptate percipitur, dum inchoamus, progredimur, interquiescimus, regredimur ut vires augeamus, appropinquamus, denique obtinemus, et hujusmodi; ut vere admodum dictum sit, *Vita sine proposito languida et vaga est.*[3] Quod simul et prudentibus et stultissimis competit, ut ait Salomon, *Pro desiderio quærit cerebrosus, omnibus immiscet se.*[4] Quinetiam videmus reges potentissimos, ad quorum nutum quæcunque sensibus grata sunt parari possent, nihilominus procurasse sibi interdum desideria humilia et inania (quemadmodum cithara fuit Neroni, gladiatoria Commodo, Antonino aurigatio, et alia aliis), quæ tamen ipsis fuerint omni affluentia voluptatum sensualium potiora. Tanto voluptatem majorem affert ut aliquid agamus, quam ut fruamur.

Illud interim paulo attentius notandum est, Bonum Activum Individuale a Bono Communionis prorsus differre, quanquam nonnunquam ambo coincidant. Quamvis enim Bonum istud Individuale Activum sæpe opera beneficentiæ (quæ ex Virtutibus Communionis est) pariat et producat; illud tamen interest, quod illa opera ab hominibus plurimis fiant non animo alios juvandi aut beandi, sed plane propter se, atque potentiam et amplitudinem propriam. Id quod optime cernitur, quando Bonum Activum in aliquid impingit, quod sit Bono Commu-

[1] Revel. xiv. 1.

[2] Cogita quamdiu jam idem facias; cibus, somnus, libido, per hunc circulum curritur; mori velle non tantum prudens et fortis aut miser, sed etiam fastidiosus potest." — *Seneca, Ep.* 77.

That "tædium vitæ" was considered by the Romans in the time of the Emperors a reasonable and legally sufficient motive for suicide appears from the *Digest* iii. 2. 11. 3., from the *Codex* ix. 50. 1., and from several other texts; — the burden of life being most felt in an advanced state of corrupt civilization.

[3] "Vita sine proposito vaga est." — *Seneca, Ep.* 95.

[4] This is probably another version of Prov. xviii. 1. "Through desire a man having separated himself seeketh and intermeddleth with all wisdom." — *J. S.*

nionis contrarium. Siquidem gigantea illa animi conditio, qua abripiuntur magni isti orbis terrarum perturbatores, (qualis fuit L. Sylla, et plurimi alii, licet in modulo longe minore, qui videntur ad hoc anhelare, ut omnes fœlices et ærumnosi sint prout sibi fuerint amici vel inimici[1], atque ut mundus tanquam ipsorum præferat imaginem; quæ vera est Theomachia); hæc inquam ipsa aspirat ad Bonum Activum Individuale, saltem Apparens, etsi a Bono Communionis omnium maxime recedat.

At Bonum Passivum partiemur in Bonum Conservativum, et Bonum Perfectivum. Etenim inditus est unicuique rei triplex appetitus, quatenus ad Bonum Suitatis, sive Individui. Primus, ut se conservet; secundus, ut se perficiat; tertius, ut se multiplicet sive diffundat. Atque hic postremus appetitus ad Bonum Activum refertur, de quo jam modo diximus. Supersunt igitur reliqua tantum duo, quæ diximus, Bona; ex quibus præcellit Perfectivum. Minus enim quiddam est, conservare rem in suo statu; majus vero, eandem ad naturam sublimiorem evehere. Reperiuntur siquidem per res universas naturæ aliquæ nobiliores, ad quarum dignitatem et excellentiam naturæ inferiores aspirant, veluti ad origines et fontes suos. Sic de hominibus, non male cecinit ille;

Igneus est ollis vigor, et cælestis origo.[2]

Homini enim, assumptio aut approximatio ad divinam aut angelicam naturam est formæ suæ perfectio. Cujus quidem Boni Perfectivi prava et præpostera imitatio pestis est ipsa vitæ humanæ, et turbo quidam rapidus qui omnia abripit et subvertit; nimirum, dum homines, exaltationis vice formalis atque essentialis, cœca ambitione advolent ad exaltationem tantummodo localem. Quemadmodum enim ægri, remedium mali sui non invenientes, de loco in locum corpus agitant et volvunt, quasi ex mutatione loci a seipsis abscedere et internum malum effugere possint; eodem modo evenit in ambitione, ut homines, simulacro quodam falso naturæ suæ exaltandæ abrepti, nihil aliud adipiscantur quam loci quandam celsitudinem et fastigium.

Bonum vero Conservativum nihil aliud est, quam *receptio et fruitio rerum naturæ nostræ congruentium.* Hoc vero Bonum,

[1] The epitaph which Plutarch says Sylla made for himself was probably in Bacon's mind. It boasted that no man had surpassed him in doing good to his friends or evil to his enemies. See Plut. in Sylla.

[2] Virg. Æn. vi. 730.

licet maxime sit simplex et nativum, tamen ex Bonis videtur mollissimum atque infimum. Quin et hoc ipsum Bonum recipit differentiam nonnullam; circa quam partim vacillavit judicium hominum, partim omissa est inquisitio. Boni siquidem Fruitionis, sive, quod vulgo dicitur, Jucundi, dignitas et commendatio aut in Sinceritate fruitionis sita est, aut in ejusdem Vigore; quorum alterum inducit et præstat Æqualitas, alterum autem Varietas et Vicissitudo; alterum minorem habet mixturam Mali, alterum impressionem magis fortem et vividam Boni. Cæterum horum utrum melius, *ambigitur;* dein, num natura humana utrunque simul apud se retinere possit, *non inquiritur.*

Atque quantum ad id de quo ambigitur, ventilari cœpit illa controversia inter Socratem et sophistam quendam.[1] Ac Socrates quidem asserebat, *Fœlicitatem sitam esse in animi pace constante et tranquillitate;* sophista vero in hoc, *ut quis multum appetat, et multum fruatur.* Quin et ab argumentis delapsi sunt ad convitia; dicente sophista *Fœlicitatem Socratis stipitis vel lapidis esse fœlicitatem;* e contra Socrate, *sophistæ Fœlicitatem, fœlicitatem esse scabiosi, qui perpetuo pruriret et scalperet.* Neque tamen desunt utrique sententiæ sua firmamenta. Nam Socrati assentitur vel Epicuri schola ipsa, quæ virtutis ad fœlicitatem partes esse maximas non diffiteatur. Quod si ita sit, certo certius est virtutis majorem esse usum in perturbationibus sedandis, quam in rebus cupitis adipiscendis. Sophistæ autem nonnihil suffragari videtur assertio illa cujus a nobis mentio modo facta est, quod videlicet Bonum Perfectivum Bono Conservativo sit superius; quippe quia cupitarum rerum adeptiones naturam videantur sensim perficere; quod licet vere non faciant, tamen et motus ipse in circulo speciem nonnullam præ se fert Motus Progressivi.

At secunda quæstio (*num,* scilicet, *natura humana non possit et animi tranquillitatem et fruendi vigorem simul retinere*), rite diffinita, priorem illam reddit otiosam et supervacaneam. Annon enim videmus haud raro animos nonnullorum ita factos et compositos, ut voluptatibus afficiantur vel maxime cum adsint, et tamen earum jacturam non gravate ferant? Ita ut series illa philosophica, *Non uti, ut non appetas; non appetere, ut non metuas;* videatur esse pusilli cujusdam animi et diffidentis.[2]

[1] See the Gorgias, p. 494.

[2] Compare Plutarch in Solone: ἄτοπος δὲ καὶ ἀγεννὴς ὁ τῷ φόβῳ τῆς ἀποβολῆς τὴν κτῆσιν ὧν χρὴ προϊέμενος.

Sane doctrinæ pleræque philosophorum videntur esse paulo timidiores, et cavere hominibus plusquam natura rerum postulat. Veluti cum mortis formidinem medendo augent. Etenim cum nihil aliud fere vitam humanam faciant quam mortis quandam præparationem et disciplinam, quomodo fieri possit, ut ille hostis mirum in modum non videatur terribilis, contra quem muniendi nullus sit finis[1]? Melius poëta (ut inter ethnicos),

> Qui finem vitæ extremum inter munera ponat
> Naturæ.[2]

Similiter et in omnibus annisi sunt philosophi animum humanum reddere nimis uniformem et harmonicum, eum motibus contrariis et extremis minime assuefaciendo. Cujus causam arbitror fuisse, quod ipsi vitæ se privatæ dedicarunt, a negotiis et aliorum obsequiis immuni et liberæ. Quin potius imitentur homines prudentiam gemmariorum; qui, si forte in gemma inveniatur nubecula aliqua aut glaciecula quæ ita posset eximi ut magnitudini lapidis non nimium detrahatur, eam tollunt; aliter vero intactam eam relinquunt. Pari ratione, serenitati animorum ita consulendum est, ut non destruatur magnanimitas. Atque de Bono Individuali hactenus.

Postquam igitur de Bono Suitatis (quod etiam *Particulare, Privatum, Individuale*, appellare solemus) jam dixerimus; repetamus Bonum Communionis, quod Societatem intuetur. Istud nomine *Officii* vocari consuevit. Siquidem vocabulum *Officii* magis proprie attribuitur animo bene disposito erga alios; vocabulum *Virtutis* animo intra se recte formato et composito. Verum ista pars, primo intuitu, Scientiæ Civili deberi videtur. Attamen si diligentius attendas, non ita. Siquidem tractat regimen et imperium uniuscujusque in seipsum, neutiquam vero in alios. Atque sicut in Architectura alia res est postes, trabes, et cæteras ædificii partes efformare, et ad ædificandi usum præparare; alia autem easdem ad invicem aptare et compaginare; sicut etiam in Mechanicis, instrumentum aut machinam fabricare et conficere, non idem est quod fabricatum erigere, movere, et in opere ponere: sic doctrina de Conjugatione ipsa Hominum in Civitate, sive Societate, differt ab ea

[1] "Ista enim philosophorum vita ut ait idem" (Socrates in the *Phædo*) "commentatio mortis est." — *Tusc. Disp.* i. 30. The reference is to the following passage: τὸ μελέτημα αὐτὸ τοῦτο ἔστι τῶν φιλοσόφων, λύσις καὶ χωρισμὸς ψυχῆς ἀπὸ τοῦ σώματος; which scarcely justifies Cicero's version of it. Contrast Spinoza, *Ethics*, iv. 67.

[2] Juven. x. 358; but *finem* is in the original *spatium*. Compare Bacon's Essay on Death.

quæ eos reddit ad hujusmodi Societatis commoda conformes et bene affectos.

Ista pars de Officiis etiam in duas portiones tribuitur; quarum altera tractat de Officio Hominis in Communi; altera de Officiis Specialibus et Respectivis, pro singulorum professione, vocatione, statu, persona, et gradu. Harum primam satis excultam, diligenterque a veteribus et aliis explicatam, jam antea retulimus; alteram quoque, sparsim quidem tractatam, licet non in corpus aliquod integrum scientiæ digestam reperimus. Neque tamen hoc ipsum, quod sparsim tractetur, reprehendimus; quinimo de hoc argumento per partes scribi longe consultius existimamus. Quis enim tanta fuerit vel perspicacia vel confidentia, ut de Officiis Peculiaribus et Relativis singulorum ordinum et conditionum perite et ad vivum disceptare et diffinire possit aut sustineat? Tractatus autem qui experientiam non sapiunt, sed ex notitia rerum generali et scholastica tantummodo deprompti sunt, de rebus hujusmodi, inanes plerunque evadunt et inutiles. Quamvis enim aliquando contingat spectatorem ea animadvertere quæ lusorem fugiant, atque jactetur proverbium quoddam magis audaculum quam sanum, de censura vulgi circa actiones principum, *Stantem in valle optime perlustrare montem;* optandum tamen inprimis esset, ut non nisi expertissimus et versatissimus quisque se hujusmodi argumentis immisceret. Hominum enim speculativorum in materiis activis lucubrationes, iis qui in agendo fuerint exercitati nihilo meliores videntur quam dissertationes Phormionis de bellis æstimatæ sunt ab Hannibale, qui eas habuit pro somniis et deliriis.[1] Unum duntaxat vitium illos occupat qui de rebus ad suum munus aut artem pertinentibus libros conscribunt; quod scilicet in illis ipsis Spartis suis ornandis[2] atque attollendis modum tenere nesciant.

In hoc genere librorum piaculum foret non meminisse (honoris causa) excellentissimi illius operis, a Majestate tua elucubrati, *De Officio Regis.*[3] Scriptum enim hoc plurimos intra se cumulavit ac recondidit thesauros, tam conspicuos quam occultos, Theologiæ, Ethicæ, et Politicæ, insigni cum aspersione aliarum artium; estque meo judicio, inter scripta quæ mihi

[1] See, for the story here alluded to, Cicero, De Orat. ii. 18.

[2] "Quam nactus es Spartam hanc orna."—*Erasm. Adag.* ii. 5. 1.

[3] The proper title of this work is *Basilicon Doron.* It contains three books. The first is, "Of a king's Christian duetie towards God;" the second, "Of a king's duetie in his office;" and the last, "Of a king's behaviour in things indifferent."

perlegere contigerit, præcipue sanum et solidum. Non illud ullo loco aut inventionis fervore æstuat, aut indiligentiæ frigore torpet aut dormitat; non vertigine aliquando corripitur, unde in ordine suo servando confundatur aut excidat; non digressionibus distrahitur, ut illa quæ nihil ad rhombum sunt expatiatione aliqua flexuosa complectatur[1]; non odoramentorum aut pigmentorum fucis adulteratur, qualibus illi utuntur qui lectorum potius delectationi quam argumenti naturæ inserviunt; ante omnia vero, spiritu valet istud opus non minus quam corpore; utpote quod et cum veritate optime consentiat et ad usum sit accommodatissimum. Quinetiam vitio illo, de quo paulo ante diximus (quod si in alio quopiam, in rege certe et scripto de majestate regia tolerandum fuerit) omnino caret; nempe, quod culmen et fastigium regium non immodice aut invidiose extollat. Siquidem Majestas tua regem non depinxit aliquem Assyriæ aut Persiæ gloria et externo fastu nitentem et coruscantem; sed vere Mosem aut Davidem, pastores scilicet populi sui. Neque vero mihi unquam memoria excidet dictum quoddam vere regium, quod in lite gravissima terminanda[2] Majestas tua, pro sacro illo quo præditus es spiritu, ad populos regendos pronunciavit; nimirum, *Reges juxta leges regnorum suorum gubernacula tractare, quemadmodum et Deus juxta leges naturæ; et æque raro prærogativam illam suam quæ leges transcendit ab illis usurpandam, ac a Deo videmus usurpari potestatem miracula patrandi.* Nihilo tamen secius ex libro illo altero a Majestate tua conscripto, *De Libera Monarchia,* satis omnibus innotescit, non minus Majestati tuæ cognitam esse et perspectam plenitudinem potestatis regiæ, atque *ultimitates* (ut scholastici loquuntur) jurium regalium, quam officii et muneris regii limites et cancellos.[3] Non dubitavi igitur in medium adducere librum illum, a Majestatis tuæ calamo exaratum, tanquam exemplum primarium et maxime illustre tractatuum de Peculiaribus et Respectivis Officiis. Quo de libro quæ a me jam dicta sunt, dixissem profecto, si ante annos mille a rege quopiam

[1] Compare the corresponding passage in the *Advancement*: — "not sick of dizziness as those are who leese themselves in their order; nor of convulsions, as those which cramp in matters impertinent." — *J. S.*

[2] Probably in the case of Sir Francis Goodwin, in 1604, when the question was whether it belonged to the House of Commons or the Court of Chancery to judge of the validity of an election. — *J. S.*

[3] This second work of James's is, "The Trew Law of Free Monarchies, or the reciprock and mutual duetie betwixt a free King and his naturall Subjects," free being nearly equivalent to absolute. This work was at first published anonymously, but is included in the edition of King James's works which appeared in 1616.

conscriptus fuisset. Neque vero me movet decorum illud, quod vulgo præscribitur, ne quis coram laudetur[1]; modo laudes illæ nec modum excedant, nec intempestive aut nulla data occasione tribuantur. Cicero certe, in luculentissima illa oratione sua pro M. Marcello, nihil aliud agit quam ut exhibeat tabulam quandam singulari artificio depictam de laudibus Cæsaris, licet coram ipso oratio illa haberetur. Quod et Plinius Secundus fecit erga Trajanum.[2] Itaque jam ad propositum revertamur.

Pertinet porro ad hanc partem de Officiis Respectivis Vocationum et Professionum singularum, doctrina alia, tanquam priori relativa sive opposita; nimirum de Fraudibus, Cautelis, Imposturis, et Vitiis ipsarum; siquidem depravationes et vitia officiis et virtutibus opponuntur. Neque omnino de his, in plurimis scriptis et tractatibus, siletur; sed sæpe ad illa notanda saltem obiter excurritur. At quo tandem modo? Per satiram scilicet, et cynice (more Luciani), potius quam serio et graviter. Etenim plus operæ impenditur, ut pleraque in artibus etiam utilia et sana maligno dente vellicentur, et ad ludibrium hominibus exponantur, quam ut quæ in iisdem corrupta sunt et vitiosa secernantur a salubribus et incorruptis. At optime Salomon; *Quærenti derisori scientiam ipsa se abscondit, sed studioso fit obviam.*[3] Quicunque enim ad scientiam accedat animo irridendi et aspernandi, inveniet proculdubio quæ cavilletur plurima, ex quibus vero doctior fiat perpauca. Verum tractatio hujus de quo loquimur argumenti gravis et prudens, atque cum integritate quadam et sinceritate conjuncta, inter munitissima virtutis ac probitatis propugnacula videtur numeranda. Nam sicut fabulose perhibetur de Basilisco, si primus quempiam conspexerit, illico hominem perimit; si quis illum prior, basiliscus perit; pari ratione fraudes, imposturæ, et malæ artes, si quis eas prior detexerit, nocendi facultate privantur, quod si illæ prævenerint, tum vero, non alias, periculum creant. Est itaque quod gratias agamus Macciavello et hujusmodi scriptoribus, qui aperte et indissimulanter proferunt quid homines facere soleant, non quid debeant. Fieri enim nullo modo potest, ut conjungatur *serpentina* illa *prudentia* cum *innocentia columbina*, nisi quis mali ipsius naturam penitus per-

[1] Πρᾶγμα κολακείᾳ μᾶλλον ἀνελευθέρῳ προσῆκον, ἢ τιμῇ, τὸ ἐπαινεῖν παρόντας. — Plutarch, De se ipsum citra invid. laud. § 1.

[2] Namely, in his *Panegyrica*. See below, p. 741.

[3] Proverbs, xiv. 6.

noscat.[1] Absque hoc enim deerunt virtuti sua præsidia et munimenta. Imo, neque ullo modo possit vir bonus et probus malos et improbos corrigere et emendare, nisi ipse prius omnia malitiæ latibula et profunda exploraverit. Etenim qui judicio plane corrupto sunt et depravato hoc habent, ut præsupponant honestatem in hominibus ab inscitia et simplicitate quadam morum oriri; atque ab eo tantum, quod fides habeatur concionatoribus et pædagogis; item libris, præceptis moralibus, et iis qui vulgo prædicantur et decantantur sermonibus. Adeo ut nisi plane perspiciant opiniones suas pravas ac corrupta et detorta principia non minus illis qui hortantur et admonent quam sibi ipsis esse explorata et cognita, probitatem omnem morum et consiliorum aspernentur: juxta oraculum illud Salomonis mirabile; *Non recipit stultus verba prudentiæ, nisi ea dixeris quæ versantur in corde ejus.*[2] Hanc autem partem de Cautelis et Vitiis Respectivis inter Desiderata numeramus; eamque nomine *Satiræ Seriæ*, sive *Tractatus de Interioribus Rerum*, appellabimus.

Etiam ad doctrinam de Officiis Respectivis pertinent Officia Mutua, inter maritum et uxorem, parentes et liberos, dominum et servum; similiter leges amicitiæ, et gratitudinis; necnon civiles obligationes fraternitatum, collegiorum; etiam vicinitatis; ac similium. Verum intelligatur hoc semper, illa istic tractari, non quatenus sunt partes Societatis Civilis (id enim ad Politicam refertur,) sed quatenus animi singulorum ad illa Societatis Vincula tuenda instrui et prædisponi debeant.[3]

At doctrina de Bono Communionis (quemadmodum et illa de Individuali) Bonum tractat non tantum simpliciter, sed et comparate; quo spectat officia perpendere inter hominem et hominem; inter casum et casum; inter privata et publica; inter tempus præsens et futurum. Sicut videre est in animadversione illa severa et atroci L. Bruti contra filios suos, illam a plerisque in cœlum laudibus efferri; at alius quispiam dixit,

[1] Compare Charron *De la Sagesse*, liv. ii. c. 10.: "Il faut temperer et marier l'innocence colombine en n'offensant personne avec la prudence et astuce serpentine en se tenant sur ses gardes et se preservant des finesses, trahisons, et ambûches d'autrui." The whole chapter is worth comparing with Bacon's remarks on the art of self-advancement.

[2] Proverbs, xviii. 2. The words are accurately quoted from the Vulgate: the authorised version is wholly dissimilar.

[3] Some curious matter as to the opinions of the Romans touching the Ordo officiorum, the order of precedence among relative duties, will be found in Aulus Gellius v. 13.

Infœlix, utcunque ferent ea facta[1] minores.[2]

Id ipsum licet intueri in cœna illa, ad quam invitati sunt M. Brutus, C. Cassius, et alii. Illic enim cum ad animos explorandos circa conspirationem in caput Cæsaris intentam, quæstio astute mota esset *Num licitum foret tyrannum occidere?* ibant convivæ in opiniones diversas; dum alii dicerent, plane licere, *quod servitus ultimum esset malorum;* alii minime, *quod tyrannis minus exitialis esset quam bellum civile;* tertium autem genus veluti ex schola Epicuri asserebat, *indignum esse prudentes periclitari pro stultis.*[3] Verum plurimi sunt casus de Officiis Comparatis, inter quos frequenter ille intervenit; *utrum a justitia deflectendum sit propter salutem patriæ, aut hujusmodi aliquod insigne bonum in futuro?* Circa quem Jason Thessalus dicere solebat, *Aliqua sunt injuste facienda, ut multa juste fieri possint*[4]: verum replicatio in promptu est; *Authorem præsentis justitiæ habes; sponsorem futuræ non habes.* Sequantur homines quæ in præsentia bona et justa sunt; futura Divinæ Providentiæ remittentes. Atque circa doctrinam de Exemplari, sive de Bono, hæc dicta sint.

CAPUT III.

Partitio Doctrinæ de Cultura Animi, in Doctrinam de Characteribus Animorum, *de* Affectibus, *et de* Remediis *sive* Curationibus. *Appendix Doctrinæ ejusdem, de* Congruitate inter Bonum Animi et Bonum Corporis.

Nunc igitur, postquam de Fructu Vitæ (sensu intelligimus philosophico) verba fecerimus; superest ut de Cultura Animi quæ ei debetur dicamus; sine qua pars prior, nihil aliud videtur quam imago quædam aut statua, pulchra quidem aspectu, sed motu et vita destituta. Cui sententiæ Aristoteles ipse disertis

[1] In the original, as also in the corresponding passage of the *Advancement of Learning*, *fata* is put for *facta*. — *J. S.*

[2] Virg. Æn. vi. 823. It is less difficult to sympathise with Sultan Mahmoud of Ghisnee. When he had killed the adulterer, he said "Now bring a light," and after looking at the corpse called for water. "God is merciful — I was mistaken. I thought no man would have ventured to commit such an outrage but my son; and since you told me of it three nights ago, I have neither eaten nor drunken." See Malcolm's *History of Persia.*

[3] See Plutarch in Brutus; where however the story is somewhat differently told.

[4] Plut. Reip. Ger. Præcep. 817.

verbis suffragatur; *Necesse est igitur de virtute dicere, et quid sit, et ex quibus gignatur. Inutile enim fere fuerit, virtutem quidem nosse, acquirendæ autem ejus modos et vias ignorare. Non enim de virtute tantum, qua specie sit, quærendum est; sed et quomodo sui copiam faciat; utrunque enim volumus, et rem ipsam nosse, et ejus compotes fieri. Hoc autem ex voto non succedet, nisi sciamus et ex quibus, et quo modo.*[1] Verbis adeo expressis, atque etiam iterato, hanc partem inculcat; quam tamen ipse non persequitur. Hoc similiter illud est, quod Cicero Catoni Juniori veluti laudem non vulgarem attribuit; quod scilicet Philosophiam amplexus esset, *Non disputandi causa, ut magna pars, sed ita vivendi.*[2] Quamvis autem, pro temporum in quibus vivimus socordia, paucis curæ sit ut animum sedulo colant et componant, et vitæ rationem ad normam aliquam instituant (secundum illud Senecæ, *De partibus vitæ quisque deliberat; de summa nemo*[3]: adeo ut hæc pars censeri possit supervacua); illud tamen minime nos movet ut eam intactam relinquamus, quin potius cum illo Hippocratis aphorismo concludimus; *Qui gravi morbo correpti dolores non sentiunt, iis mens ægrotat.*[4] Medicina illis hominibus opus est, non solum ad curandum morbum, sed ad sensum expergefaciendum. Quod si quis objiciat animorum curationem Theologiæ Sacræ munus esse, verissimum est quod asserit; attamen Philosophiam Moralem in famulitium Theologiæ recipi instar ancillæ prudentis et pedissequæ fidelis, quæ ad omnes ejus nutus præsto sit et ministret, quid prohibeat? Etenim quemadmodum in Psalmo habetur, quod *oculi ancillæ perpetuo ad manus dominæ respiciunt*[5], cum tamen minime dubium sit, quin haud pauca ancillæ judicio et curæ relinquantur; eodem modo et Ethica obsequium Theologiæ omnino præstare debet, ejusque præceptis morigera esse; ita tamen ut et ipsa, intra suos limites, haud pauca sana et utilia documenta continere possit.

Hanc igitur partem (quando præstantiam ejus in animo recolo) in Corpus Doctrinæ nondum redactam, non possum non vehementer mirari. Eam igitur, ex more nostro, cum inter Desiderata collocemus, aliqua ex parte adumbrabimus.

Ante omnia igitur in hac re (sicut et in universis quæ

[1] Arist. Magn. Moral. i. 1.

[2] "Neque disputandi causâ, ut magna pars, sed ita vivendi."— *Cicero, Pro Murœn.* c. 30.

[3] Seneca, Ep. 71. [4] Hippocr Aphorism. ii 6. [5] Psalm cxxiii. 2.

spectant ad practicam) ratio nobis est subducenda, quid in nostra sit potestate, quid non. In altero enim datur alteratio, in altero vero applicatio tantum. Agricolæ nullum est imperium aut in naturam soli, aut in aëris temperies; itidem nec medico aut in crasin et constitutionem naturalem ægri, aut in accidentium varietatem. At in Cultura Animi, et morbis ejus persanandis, tria in considerationem veniunt; Characteres diversi Dispositionum; Affectus; et Remedia; quemadmodum et in corporibus medicandis proponuntur illa tria, Complexio sive Constitutio ægri; Morbus; et Curatio. Ex illis autem tribus, postremum tantum in nostra potestate situm est, priora duo non item. Verum et in illis ipsis quæ in potestate nostra non sunt non minus diligens facienda est inquisitio, quam in illis quæ potestati nostræ subjiciuntur. Etenim illorum perspicax et accurata cognitio substernenda est doctrinæ de Remediis, ut eadem commodius et fœlicius applicentur. Neque enim vestis corpori aptari possit, nisi mensura corporis ante excipiatur.

Primus igitur articulus doctrinæ de Cultura Animi versabitur circa diversos Characteres Ingeniorum sive Dispositionum. Neque tamen loquimur de vulgatis illis propensionibus in virtutes et vitia, aut etiam in perturbationes et affectus; sed de magis intrinsecis et radicalibus. Sane subiit animum etiam in hac parte nonnunquam admiratio, quod a scriptoribus, tam Ethicis quam Politicis, ut plurimum neglecta aut prætermissa sit; cum utrique scientiæ clarissimum luminis jubar affundere possit. In Traditionibus Astrologiæ non inscite omnino distincta sunt ingenia et dispositiones hominum, ex prædominantiis planetarum; quod alii a natura facti sint ad Contemplationes, alii ad Res Civiles; alii ad Militiam; alii ad Ambitum; alii ad Amores; alii ad Artes; alii ad Genus Vitæ Varium. Item apud Poëtas (heroïcos, satiricos, tragicos, comicos) sparguntur ubique simulachra ingeniorum, licet fere cum excessu et præter modum veritatis. Quin et hoc ipsum argumentum, de Diversis Characteribus Ingeniorum, est ex iis rebus in quibus sermones hominum communes (quod valde raro, interdum tamen contingit) libris ipsis sunt prudentiores. At longe optima hujus tractatus suppellex et sylva peti debet ab Historicis prudentioribus; neque tamen ab elogiis tantum, quæ sub obitum personæ alicujus illustris subnectere solent; sed multo magis ex corpore integro Historiæ, quoties hujusmodi persona veluti scenam conscendat. Illa enim intertexta imago potior videtur

descriptio, quam elogii censura; qualis habetur apud T. Livium, Africani et Catonis Majoris; apud Tacitum, Tiberii, Claudii, et Neronis; apud Herodianum, Septimii Severi; apud Philippum Comineum, Ludovici undecimi Gallorum Regis; apud Franciscum Guicciardinum, Ferdinandi Hispani, Maximiliani Cæsaris, et Leonis et Clementis Pontificum. Isti enim scriptores, harum personarum quas sibi depingendas deligerunt effigies quasi perpetuo intuentes, nunquam fere rerum gestarum ab ipsis mentionem faciunt, quin et aliquid insuper de natura ipsorum inspergant. Etiam nonnullæ in quas incidimus Relationes de Conclavibus Pontificum, characteres de moribus Cardinalium bonos exhibuerunt[1]; sicut et literæ legatorum, de consiliariis principum. Fiat itaque ex ea quam diximus materia (quæ certe fertilis est et copiosa) tractatus diligens et plenus. Neque vero volumus, ut Characteres isti in Ethicis (ut fit apud historicos, et poëtas, et in sermonibus communibus) excipiantur, tanquam imagines civiles integræ; sed potius ut imaginum ipsarum lineæ et ductus magis simplices; quæ inter se compositæ et commixtæ quascunque effigies constituunt; quot et quales eæ sint et quomodo inter se connexæ et subordinatæ; ut fiat tanquam artificiosa et accurata ingeniorum et animorum dissectio, atque ut dispositionum in hominibus individuis secreta prodantur, atque ex eorum notitia curationum animi præcepta rectius instituantur.

Neque vero Characteres Ingeniorum ex natura impressi, recipi tantum in hunc tractatum debent; sed et illi qui alias animo imponuntur, ex Sexu, Ætate, Patria, Valetudine, Forma, et similibus; atque insuper illi qui ex Fortuna; veluti Principum, Nobilium, Ignobilium, Divitum, Pauperum, Magistratuum, Idiotarum, Fœlicium, Ærumnosorum, et hujusmodi. Videmus enim Plautum miraculi loco habere, quod senex quis sit beneficus; *Benignitas hujus ut adolescentuli est.*[2] D. autem Paulus, severitatem disciplinæ erga Cretenses præcipiens (*Increpa eos dure*) ingenium gentis ex Poëta accusat, *Cretenses semper mendaces, malæ bestiæ, ventres pigri.*[3] Sallustius id in

[1] For an account of the writings here referred to, which were generally composed by the "Conclavisti," but sometimes by one of the Cardinals, see Ranke's work "*Die Römischen Päpste*, sect. 5. of the Appendix. Among the *Litteræ Legatorum*, those of the Venetians are especially valuable. They are, properly speaking, reports made to the senate on the ambassador's return.

[2] Plaut. Mil. Glori. iii. 1. 40.

[3] St. Paul, Ep. to Titus, i. 12. and 13. The poet referred to is Epimenides.

regum ingeniis notat, quod apud eos frequens sit contradictoria appetere; *Plerunque regiæ voluntates, ut vehementes sunt, sic mobiles, sæpeque ipsæ sibi adversæ.*[1] Tacitus observat honores et dignitates ingenia hominum in deterius sæpius flectere quam in melius; *Solus Vespasianus mutatus est in melius.*[2] Pindarus illud animadvertit, fortunam subitam et indulgentem animos plerunque enervare et solvere; *Sunt qui magnam fœlicitatem concoquere non possunt.*[3] Psalmus innuit, facilius esse modum adhibere et temperamentum in fortunæ statu, quam in incremento; *Divitiæ si affluant, nolite cor apponere.*[4] De similibus quibusdam observationibus ab Aristotele in Rhetoricis mentionem obiter factam non inficior; necnon in aliorum scriptis nonnullis sparsim; verum nunquam adhuc incorporatæ fuerunt in Moralem Philosophiam; ad quam principaliter pertinent; non minus certe quam ad agriculturam tractatus de diversitate soli et glebæ, aut ad medicinam, tractatus de complexionibus aut habitibus corporum diversis. Id autem nunc tandem fieri oportet, nisi forte imitari velimus temeritatem empiricorum, qui iisdem utuntur medicamentis ad ægrotos omnes, cujuscunque sint constitutionis.

Sequitur doctrinam de Characteribus, doctrina de Affectibus et Perturbationibus; qui loco morborum animi sunt, ut jam dictum est. Quemadmodum enim politici prisci de democratiis dicere solebant, quod *populus esset mari ipsi similis, oratores autem ventis;* quia sicut Mare per se placidum foret et tranquillum, nisi a Ventis agitaretur et turbaretur, sic et Populus esset natura sua pacatus et tractabilis, nisi a Seditiosis Oratoribus impelleretur et incitaretur[5]; similiter vere affirmari possit na-

[1] Sall. Bell. Jug. c. 121. Bacon has himself remarked that it is the solecism of power to will contradictories; a phrase of which we lose the force by not observing that a solecism is properly "impar et inconveniens compositura partium orationis," not merely any kind of error. V. Sinnius Capito ap. A. Gellium, v. 20.

[2] Tac. Hist. i. 50.

[3] Bacon alludes to an expression which occurs in the first Olympic ode; where however there is no general reflexion on the difficulty "concoquendi felicitatem," though it is certainly said that Tantalus did not do so. Vide Pind. Olymp. i. 88.

[4] Ps. lxii. 10.

[5] "Ex quo intelligi potuit id quod sæpe dictum est, ut mare quod suâ naturâ tranquillum sit ventorum vi agitari atque turbari, sic et populum Romanum suâ sponte esse placatum, hominum seditiosorum vocibus ut violentissimis tempestatibus concitari." —*Cicero, Pro Cluent.* c. 49. From one of the Apophthegms it would seem that Bacon's phrase *prisci politici* refers especially to Solon, who however was thinking not of popular orators but of Pisistratus. Solon's lines are well known: —

ἐξ ἀνέμων δὴ θάλασσα ταράσσεται, ἢν δέ τις αὐτὴν
μὴ κινῇ, πάντων ἐστὶ δικαιοτάτη.
ἐνδρῶν δ' ἐκ μεγάλων πόλις ὄλλυται, κ.τ.λ.

turam Mentis Humanæ sedatam fore et sibi constantem, si Affectus, tanquam venti, non tumultuarentur ac omnia miscerent. Et hic rursus subiit nova admiratio, Aristotelem, qui tot libros de Ethicis conscripsit, Affectus ut membrum Ethicæ principale in illis non tractasse; in Rhetoricis autem ubi tractandi interveniunt secundario (quatenus scilicet oratione cieri aut commoveri possint) locum illis reperisse; (in quo tamen loco, de iis, quantum tam paucis fieri potuit, acute et bene disseruit).[1] Nam disceptationes ejus de Voluptate et Dolore huic tractatui nullo modo satisfaciunt; non magis, quam qui de Luce et Lumine tantum scriberet, de Particularium Colorum Naturâ scripsisse diceretur; siquidem Voluptas et Dolor erga Affectus Particulares ita se habent, ut Lux erga Colores. Meliorem certe in hoc argumento (quatenus ex his quæ nunc extant conjicere liceat) diligentiam adhibuerunt Stoici; attamen talem, quæ potius in diffinitionum subtilitate quam in tractatu aliquo pleno et fuso consisteret. Equidem reperio etiam libellos quosdam elegantes de nonnullis ex Affectibus; veluti de Ira, de Inutili Verecundia, et aliis perpaucis.[2] Sed si verum omnino dicendum sit, doctores hujus scientiæ præcipui sunt Poëtæ et Historici; in quibus ad vivum depingi et dissecari solet, Quomodo Affectus excitandi sunt et accendendi? Quomodo leniendi et sopiendi? Quomodo rursus continendi ac refrænandi, ne in actus erumpant? Quomodo itidem se, licet compressi et occultati, prodant? Quas operationes edant? Quas vices subeant? Qualiter sibi mutuo implicentur? Qualiter inter se digladientur et opponantur? et innumera hujus generis. Inter quæ hoc ultimum plurimi est usus in Moralibus et Civilibus; *Qualiter* (inquam) *Affectus Affectum in ordinem cogat, et alterius auxilio ad alterum subjugandum uti liceat?* venatorum et aucupum more, qui bestiæ opera ad bestias, volucris alicujus ad volucres, capiendas utuntur; quod fortasse aliter ex sese, absque brutorum auxilio, homo tam facile præstare non possit. Quin et hoc fundamento nititur excellens ille et per omnia patens usus in civilibus Præmii et Pœnæ; quæ rerumpublicarum columen sunt; cum Affectus illi prædominantes, Formidinis et Spei, alios omnes Affectus noxios coërceant et

[1] See the second book of Aristotle's Rhetoric.

[2] Bacon was probably thinking of Plutarch's tract περὶ δυσωπίας, which is I think the only one on this subject which has come down to us from antiquity. On anger there are two special treatises; Plutarch's and Seneca's.

supprimant. Etiam sicut in regimine status non raro fit, ut factio factione in officio contineatur, similiter fit et in regimine mentis interno.

Pervenimus nunc ad illa, quæ in nostra sunt potestate; quæque operantur in animum, voluntatemque et appetitum afficiunt et circumagunt, ideoque ad immutandos mores plurimum valent. Qua in parte debuerant Philosophi strenue et gnaviter inquirere, de viribus et energia Consuetudinis, Exercitationis, Habitus, Educationis, Imitationis, Æmulationis, Convictus, Amicitiæ, Laudis, Reprehensionis, Exhortationis, Famæ, Legum, Librorum, Studiorum, et si quæ sunt alia. Hæc enim sunt illa quæ regnant in Moralibus; ab istis agentibus animus patitur et disponitur; ab istis, veluti ingredientibus, conficiuntur pharmaca, quæ ad conservandam et recuperandam animi sanitatem conducant; quatenus remediis humanis id præstari possit. Ex quorum numero unum aut alterum seligemus, in quibus paululum immoremur, ut reliquis sint exemplo. De Consuetudine igitur et Habitu, pauca delibabimus.

Opinio illa Aristotelis, plane mihi videtur angustias quasdam contemplationis et negligentiam sapere, cum asserit in illas actiones quæ naturales sunt Consuetudinem nihil posse; exemplo usus, quod *si lapis millies projiciatur in altum, ne inclinationem quidem sponte ascendendi acquirit;* quinetiam, quod *sæpius videndo aut audiendo, nihilo melius aut videmus aut audimus.*[1] Quamvis enim hoc teneat in aliquibus ubi natura est peremptoria (cujus rei causas reddere in præsentia non vacat), aliter tamen in illis fit in quibus natura, secundum latitudinem quandam, patitur intentionem et remissionem. Sane videre potuit *chirothecam* paulo arctiorem, manui sæpius inducendo, laxiorem reddi; *baculum* usu et mora in contrarium flexus sui naturalis incurvari, et in eodem statu paulo post durare; *vocem* exercitando magis fieri robustam et sonoram; *frigora æstumque* consuetudine tolerari; et ejusdem generis complura. Quæ quidem posteriora duo exempla propius accedunt ad rem, quam quæ ab ipso adducta sunt. Attamen, utcunque hoc se habeat, quo magis verum fuerit *tam virtutes quam vitia in habitu consistere,* eo magis ei contendendum fuerat ut normas præscriberet, quomodo hujusmodi habitus fuerint acquirendi aut amovendi. Plurima siquidem confici possint præcepta de prudenti institutione

[1] Arist. Eth. ad Nicom. ii. 1.

exercitationum animi, non minus quam corporis. Illorum paucula recensebimus.

Primum erit, ut jam a principio *caveamus a pensis vel magis arduis vel magis pusillis* quam res postulat. Nam si oneris nimium imponatur, apud ingenium mediocre, bene sperandi alacritatem obtundes; apud ingenium fiduciæ plenum, opinionem concitabis qua plus sibi polliceatur quam præstare possit; quod secum trahit socordiam. In utroque autem ingenii temperamento, fiet ut experimentum expectationi non satisficiat; id quod animum semper dejicit et confundit. Quod si pensa leviora fuerint, magna inducitur in progressionis summa jactura.

Secundum erit, ut *ad exercendam facultatem aliquam, quo habitus comparetur, duo imprimis tempora observentur;* alterum, quando animus optime fuerit ad rem dispositus; alterum quando pessime. Ut ex priore, plurimum in via promoveamus; ex posteriore, nodos obicesque animi contentione strenua deteramus; unde tempora media facile et placide labentur.

Tertium erit illud præceptum, cujus Aristoteles[1] obiter meminit; *ut totis viribus* (citra tamen vitium) *nitamur in contrarium illius, ad quod natura maxime impellimur;* sicut cum in adversum gurgitis remigamus, aut baculum incurvum, ut rectum fiat, in contrarium flectimus.

Quartum præceptum ex illo axiomate pendet, quod verissimum est; *animum ad quæcunque fœlicius trahi et suavius, si illud quo tendimus in intentione operantis non sit principale, sed tanquam aliud agendo superetur;* quoniam ita fert Natura, ut necessitatem et imperium durum ferme oderit. Sunt et alia multa quæ utiliter præcipi possint de regimine Consuetudinis. Consuetudo enim, si prudenter et perite inducatur, fit revera (ut vulgo dicitur) *altera natura;* quod si imperite et fortuito administretur, erit tantum *simia* naturæ; quæ nihil ad vivum imitetur, sed inscite tantum et deformiter.

Similiter, si de Libris et Studiis, eorumque ad Mores virtute et influentia, verba facere vellemus; numnam desunt plurima præcepta et consilia fructuosa eo spectantia? Annon unus ex Patribus, magna cum indignatione, Poësim appellavit *vinum dæmonum*[2]; cum revera progignat plurimas tentationes, cupidi-

[1] Arist. Eth. ad Nicom. ii. 9.

[2] Bacon seems to have been thinking of the following passage in Agrippa's *De Incertitudine*, &c. c. 4.: "Augustinus Poësim vocat vinum erroris ab ebriis doctoribus

tates, et opiniones vanas? Annon prudens admodum, et digna quæ bene perpendatur, est sententia Aristotelis; *Juvenes non esse idoneos Moralis Philosophiæ auditores*[1]; quia in illis perturbationum æstuatio nondum sedata est, nec tempore et rerum experientia consopita? Atque ut verum dicamus, annon ideo fit, ut scriptorum priscorum præstantissimi libri et sermones (quibus ad virtutem homines efficacissime invitati sunt; tam augustam ejus majestatem omnium oculis repræsentando, quam opiniones populares in virtutis ignominiam, tanquam habitu parasitorum indutas, derisui propinando) tam parum prosint ad vitæ honestatem et mores pravos corrigendos, quia perlegi et revolvi non consueverunt a viris ætate et judicio maturis, sed pueris tantum et tironibus relinquuntur? Annon et hoc verum est, juvenes multo minus Politicæ quam Ethicæ auditores idoneos esse, antequam Religione et Doctrina de Moribus et Officiis plane imbuantur; ne forte judicio depravati et corrupti in eam opinionem veniant, non esse rerum differentias morales veras et solidas, sed omnia ex utilitate aut successu metienda? Sicut poëta canit;

Prosperum et fœlix scelus virtus vocatur:[2]

et rursus,

Ille crucem pretium sceleris tulit, hic diadema.[3]

Ac poëtæ quidem hæc satirice, et per indignationem loqui videntur; at Libri nonnulli Politici idem serio et positive supponunt. Sic enim Macciavello dicere placet, *Quod si contigisset Cæsarem bello superatum fuisse, Catilina ipso fuisset odiosior*[4]; quasi vero nihil interfuisset, præter fortunam solam, inter furiam quandam ex libidine et sanguine conflatam, atque animum excelsum et inter homines naturales maxime omnium

propinatum. Hieronymus eam dæmonum cibum appellat." The combination of the two quotations might easily give rise to the phrase "dæmonum vinum." The passage of St. Augustine to which Agrippa refers occurs in the first book of the *Confessions*.

[1] Arist. Eth. ad Nicom. i. 3. Aristotle, however, speaks not of moral but of political philosophy. It is interesting to observe that the error of the text, which occurs also in the *Advancement of Learning*, has been followed by Shakespeare in *Troilus and Cressida*: —

"Not much
Unlike young men, whom Aristotle thought
Unfit to hear *moral* philosophy."

See Hector's speech in the second scene of the second act.

[2] Senec. Herc. Fur. 251.:—

Prosperum et felix scelus
Virtus vocatur.

[3] Juven. xiii. 105.

[4] Macchiav. Discorsi, l. 10.

(si ambitio abfuisset) suspiciendum. Videmus etiam ex hoc ipso quam necessarium sit homines doctrinas pias et Ethicas, antequam Politicam degustent, plenis faucibus haurire; nimirum, quod qui in aulis principum et negotiis civilibus a teneris (ut aiunt) unguiculis innutriti sunt, nunquam fere sinceram et internam morum probitatem assequantur; quanto minus, si accesserit etiam librorum disciplina? Porro et in documentis ipsis moralibus, vel saltem aliquibus eorum, annon cautio pariter est adhibenda, ne inde fiant homines pertinaces, arrogantes, et insociabiles, juxta illud Ciceronis de M. Catone; *Hæc bona, quæ videmus, divina et egregia, ipsius scitote esse propria; quæ nonnunquam requirimus, ea sunt omnia non a natura, sed a magistris?*[1] Sunt et axiomata alia complura de iis quæ a Studiis et Libris hominum animis ingenerantur. Verum est enim quod dicit ille, *Abeunt studia in mores*[2]: quod pariter affirmandum de cæteris illis rebus, Convictu, Fama, Legibus patriis, et reliquis, quas paulo ante recensuimus.

Cæterum Animi quædam est Cultura, quæ adhuc magis accurata et elaborata videtur quam reliquæ. Nititur autem hoc fundamento; *quod omnium mortalium animi certis temporibus reperiantur in statu perfectiore; aliis in statu magis depravato.* Hujus igitur culturæ intentio fuerit et institutum, ut bona illa tempora foveantur, prava vero tanquam ex kalendario deleantur et expungantur. Ac bonorum quidem temporum fixatio duobus modis procuratur; votis, aut saltem constantissimis animi decretis; et observantiis atque exercitationibus; quæ non tantum in se valent, quantum in hoc, quod animum in officio et obedientia jugiter contineant. Malorum temporum obliteratio duplici itidem ratione perfici potest; redemptione aliqua vel expiatione præteritorum; et novo vitæ instituto, veluti de integro. Verum hæc pars ad Religionem plane spectare videtur; nec mirum, cum Moralis Philosophia vera et genuina (sicut ante dictum est) ancillæ tantum vices erga Theologiam suppleat.

Quamobrem concludemus hanc partem de Cultura Animi cum eo remedio, quod omnium est maxime compendiosum et summarium, et rursus maxime nobile et efficax, quo animus ad virtutem efformetur, et in statu collocetur perfectioni proximo. Hoc autem est, *ut fines vitæ actionumque deligamus et nobis ipsis*

[1] Cicero, Pro Muræn. c. 445.

[2] Vide suprà, p. 445.

proponamus rectos et virtuti congruos ; qui tamen tales sint ut eos assequendi nobis aliquatenus suppetat facultas. Si enim hæc duo supponantur; ut et *fines actionum sint honesti et boni*, et *decretum animi de iis assequendis et obtinendis fixum sit et constans;* sequetur ut continuo vertat et efformet se animus una opera in virtutes omnes. Atque hæc certe illa est operatio quæ Naturæ ipsius opus referat; cum reliquæ, quas[1] diximus, videantur esse solummodo sicut opera Manus. Quemadmodum enim Statuarius, quando simulachrum aliquod sculpit aut incidit, illius solummodo partis figuram effingit circa quam manus occupata est, non autem cæterarum; (veluti si faciem efformet, corpus reliquum rude permanet et informe saxum, donec ad illud quoque pervenerit;) e contra vero Natura, quando florem molitur aut animal, rudimenta partium omnium simul parit et producit; eodem modo, quando virtutes habitu acquiruntur, dum temperantiæ incumbimus, ad fortitudinem aut reliquas parum proficimus; quando autem Rectis et Honestis Finibus nos dedicaverimus penitus et devoverimus, quæcunque fuerit virtus quam animo nostro commendaverint et imperaverint fines illi, reperiemus nos jamdudum imbutos et prædispositos habilitate et propensione nunnulla ad eam assequendam et exprimendam. Atque hic possit esse status ille animi, qui egregie ab Aristotele describitur, et ab eo non Virtutis sed Divinitatis cujusdam charactere insignitur. Ipsa ejus verba hæc sunt; *Immanitati autem consentaneum est opponere eam quæ supra humanitatem est, Heroïcam sive Divinam virtutem.* Et paulo post; *Nam ut feræ neque vitium neque virtus est, sic neque Dei. Sed hic quidem status altius quiddam virtute est; ille aliud quiddam a vitio.*"[2] Plinius certe Secundus, ex licentia magniloquentiæ ethnicæ, Trajani virtutem Divinæ non tanquam imitamentum, sed tanquam exemplar, proponit, cum ait; *Opus non esse hominibus alias ad Deos preces fundere, quam ut benignos æque et propitios se dominos mortalibus præstarent, ac Trajanus præstitisset.*[3] Verum hæc profanam ethnicorum jactantiam sapiunt, qui umbras quasdam corpore majores prensabant. At religio vera et sancta fides Christiana rem ipsam petit; imprimendo animis

[1] In all the editions *quæ* occurs instead of *quas*. I follow M. Bouillet in restoring what is doubtless the true reading.

[2] Arist. Eth. ad Nicom. vi. 1.

[3] "Pro nobis ipsis quidem hæc fuit summa votorum, ut nos sic amarent quomodo tu."—*Plin. Paneg.* c. 74.

hominum charitatem, quæ appositissime *vinculum perfectionis*[1] appellatur, quia virtutes omnes simul colligat et revincit. Sane elegantissime dictum est a Menandro de Amore Sensuali, qui Divinum illum perperam imitatur, *Amor melior sophista lævo ad humanam vitam.*[2] Quibus innuit, morum decus melius ab amore efformari quam a sophista et præceptore inepto, quem *lævum* appellat. Siquidem universis suis operosis regulis et præceptionibus hominem tam dextre et expedite effingere nequeat ut seipsum et in pretio habeat et se belle in omnibus componat, quam amor facit. Sic proculdubio, si animus cujuspiam fervore Charitatis veræ incendatur, ad majorem perfectionem evehetur quam per universam Ethicam Doctrinam; quæ Sophistæ profecto habet rationem, si cum altera illa conferatur. Quinetiam, sicut Xenophon recte observavit, *Cæteros affectus, licet animum attollant, eum tamen distorquere et discomponere per ecstases et excessus suos; amorem vero solum eum simul et dilatare et componere*[3]; sic omnes aliæ humanæ quas admiramur dotes, dum naturam in majus exaltant, excessui interim sunt obnoxiæ; sola autem charitas non admittit excessum. Angeli, dum ad Potentiam divinæ parem aspirarent, prævaricati sunt et ceciderunt; *Ascendam et ero similis Altissimo.*[4] Homo, dum ad Scientiam divinæ parem aspiraret, prævaricatus est et lapsus; *Eritis sicut Dii, scientes bonum et malum.*[5] Verum ad similitudinem divinæ Bonitatis aut Charitatis aspirando, nec angelus nec homo unquam in periculum venit aut veniet. Imo ad hanc ipsam imitationem etiam invitamur; *Diligite inimicos vestros, benefacite his qui oderunt vos, et orate pro persequentibus et calumniantibus vos, ut sitis filii Patris vestri qui in cœlis est, qui solem suum oriri facit super bonos et malos, et pluit super justos et injustos.*[6] Quin et in ipso archetypo Naturæ Divinæ, verba sic collocat religio ethnica, *Optimus Maximus;* scriptura autem Sacra pronunciat, *Misericordia ejus super omnia opera ejus.*[7]

[1] Ep. to Coloss. iii. 14.

[2] Not Menander, but Anaxandrides:—

ἔρως σοφιστοῦ γίγνεται διδάσκαλος
σκαιοῦ πολὺ κρείττων πρὸς τὸν ἀνθρώπου βίον.

[3] See the passage at the beginning of Xenophon's *Symposium*, in which the appearance of Callias is described.

[4] Isaiah xiv. 14. "Diabolus peccavit appetendo similitudinem Dei quantum ad potentiam."—S. Thomas Aquinas, *Sum. Theol. Sec. Secund.* q. 163. Compare the note at p. 465.

[5] Gen. iii. 5. [6] St. Matth. v. 44. [7] Psalm cxlv. 9.

Hanc itaque Moralis Doctrinæ partem, de Georgicis Animi, jam absolvimus. In qua, si ex intuitu portionum ejus quas perstrinximus, quis existimet operam nostram in hoc tantummodo etiam esse, ut ea in Artem seu Doctrinam redigeremus quæ ab aliis scriptoribus prætermissa sint tanquam vulgata et obvia, et per se satis clara et perspicua; suo judicio libere utatur. Interim illud meminerit, quod ab initio monuimus, propositum a nobis esse non rerum pulchritudinem, sed usum et veritatem sectari. Recordetur etiam paulisper commentum illud parabolæ antiquæ, de geminis Somni portis.

> Sunt geminæ Somni portæ, quarum altera fertur
> Cornea, qua veris facilis datur exitus umbris;
> Altera candenti perfecta nitens elephanto,
> Sed falsa ad cœlum mittunt insomnia Manes.[1]

Insignis sane magnificentia *portæ eburneæ;* tamen *somnia vera* per *corneam* commeant.

Additamenti vice poni possit circa doctrinam Ethicam observatio illa, inveniri nimirum relationem et congruitatem quandam inter Bonum Animi et Bonum Corporis. Nam sicut Bonum Corporis constare diximus ex Sanitate, Pulchritudine, Robore, ac Voluptate; sic Animi Bonum, si juxta Moralis Doctrinæ scita illud contemplemur, huc tendere perspiciemus; ut animum reddat *sanum,* et a perturbationibus immunem; *pulchrum,* verique decoris ornamentis excultum; *fortem* ac agilem ad omnia vitæ munia obeunda; denique non *stupidum,* sed *voluptatis* et solatii honesti sensum vivide retinentem. Hæc autem, sicut in Corpore, ita et in Animo, raro simul omnia conjunguntur. Facile enim videre est multos ingenii viribus et fortitudine animi pollentes, quos infestant tamen perturbationes, quorumque etiam moribus vix aliquid elegantiæ aut venustatis aspergitur; alios, quibus abunde est in moribus elegantiæ et venustatis, illis tamen non suppetit aut probitas animi ut velint aut vires ut possint recte agere; alios, animo præditos honesto atque a vitiorum labe repurgato, qui tamen nec sibi ipsis ornamento sunt, nec reipublicæ utiles; alios qui istorum fortasse trium compotes sunt, sed tamen, Stoica quadam tristitia et stupiditate præditi, virtutis quidem actiones exercent, gaudiis non perfruuntur. Quod si contingat, ex

[1] Virg. Æn. vi. 894.

quatuor istis duo aut tria aliquando concurrere, rarissime tamen fit, quemadmodum diximus, ut omnia. Jam vero principale istud membrum Philosophiæ Humanæ, quæ Hominem contemplatur quatenus ex Corpore consistit atque Anima, sed tamen Segregatum et citra Societatem, a nobis pertractatum est.

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DE DIGNITATE ET AUGMENTIS SCIENTIARUM

LIBER OCTAVUS.

AD REGEM SUUM.

CAPUT I.

Partitio Doctrinæ Civilis in Doctrinam de Conversatione, *Doctrinam de* Negotiis, *et Doctrinam de* Imperio *sive* Republica.

Vetus est narratio (Rex Optime) convenisse complures philosophos solenniter coram legato regis exteri, atque singulos pro virili parte sapientiam suam ostentasse, ut haberet legatus quæ referret de mirabili sapientia Græcorum. Unus tamen ex eorum numero silebat, et nihil adducebat in medium; adeo ut legatus ad eum conversus diceret, *Tu vero quid habes quod referam?* Cui ille; *Refer* (inquit) *regi tuo te invenisse apud Græcos aliquem qui tacere sciret.*[1] Equidem oblitus eram in hac artium synopsi Artem Tacendi interserere; quam tamen (quoniam plerumque *desideretur*) exemplo jam proprio docebo. Etenim, cum me tandem ordo rerum ad illud deduxerit, ut paulo post de Arte Imperii tractandum sit; cumque ad tantum regem scribam, qui perfectus adeo in ea arte sit magister, ipsamque ab incunabulis suis hauserit; nec omnino immemor esse possim, qualem apud Majestatem tuam locum sustinuerim; consentaneum magis existimavi meipsum *tacendo* de hac re, apud Majestatem tuam, quam scribendo, probare. Cicero vero

[1] This story is told of Zeno. See Plutarch De Garrulitate, and Diog. Laert. vii. 24.

non solum artis, verum etiam eloquentiæ cujusdam, quæ in tacendo reperiatur, meminit. Cum enim sermones nonnullos suos, cum alio quodam ultro citroque habitos, in epistola quadam ad Atticum commemorasset, sic scribit; *Hoc loco sumpsi aliquid de tua eloquentia, nam tacui.*[1] Pindarus vero (cui illud peculiare est, animos hominum inopinato sententiola aliqua mirabili, veluti virgula divina, percutere) hujusmodi quidpiam ejaculatur; *Interdum magis afficiunt non dicta quam dicta.*[2] In hac parte igitur, tacere, aut (quod silentio proximum est) brevis admodum esse, decrevi. Verum, antequam ad Artes Imperii perveniam, haud pauca de aliis Doctrinæ Civilis portionibus sunt præmittenda.

Scientia Civilis versatur circa subjectum quod cæterorum omnium maxime est materiæ immersum, ideoque difficillime ad axiomata reducitur. Sunt tamen nonnulla quæ hanc difficultatem levant. Primo enim, quemadmodum Cato ille Censorius de Romanis suis dicere solitus est, *Ovibus eos similes esse, quarum gregem integrum minore quis molestia ageret quam unam aliquam; quoniam si paucas ex grege ut rectam ineant viam propellere possis, cæteræ ultro sequentur*[3]; similiter, hoc quidem respectu, Ethicæ munus est quodammodo illo Politicæ difficilius. Secundo, proponit sibi Ethica ut animus *bonitate interna* imbuatur et cumuletur; at Civilis Scientia nihil amplius postulat, præter bonitatem externam: hæc enim ad *societatem* sufficit. Itaque non raro accidit, ut regimen sit bonum, tempora mala; siquidem in Sacra Historia illud non semel occurrit (cum de regibus bonis et piis narretur), *Sed adhuc populus non direxerat cor suum ad Dominum Deum patrum suorum.*[4] Itaque et hoc quoque respectu duriores partes sunt Ethicæ. Tertio, hoc habent respublicæ, ut tanquam machinæ grandiores tardius moveantur, nec sine magno molimine; unde haud tam cito labefactantur. Sicut enim in Ægypto septem anni fertiles steriles septem sustentarunt; ita in rebuspublicis priorum temporum bona institutio efficit ut sequentium errores non statim perniciem inferant. At singulorum hominum decreta et mores magis subito subverti solent. Hoc denique Ethicam gravat, Politicæ succurrit.

Scientia Civilis tres habet partes, juxta tres societatis ac-

[1] Cic. Ep. ad Att. xiii. 42. The person in question was his nephew Q. Cicero.
[2] Pindar. Nem. v. 32. [3] Plut. in Cato. c. 8. [4] 2 Chr. xx. 33.

tiones summarias; Doctrinam de Conversatione, Doctrinam de Negotiis, et Doctrinam de Imperio sive Republica. Tria siquidem sunt Bona, quæ ex Societate Civili homines sibi parare expetunt; solamen contra Solitudinem; adjumentum in Negotiis; et protectio contra Injurias. Suntque istæ tres prudentiæ plane inter se diversæ, et sæpenumero disjunctæ; Prudentia in Conversando; Prudentia in Negotiando; et Prudentia in Gubernando.

Enimvero, quod ad Conversationem attinet, illa certe affectata esse non debet, at multo minus neglecta; cum prudentia in ejus moderamine et decus quoddam morum in seipsa præ se ferat, et ad negotia tam publica quam privata commode administranda plurimum juvet. Etenim sicut actio oratori tanti habetur (licet sit externum quiddam) ut etiam illis alteris partibus, quæ graviores et interiores videntur, anteponatur; eodem fere modo in viro civili, Conversatio ejusque regimen (utcunque in exterioribus occupetur) si non summum, at certe eximium locum invenit. Quale enim pondus habet Vultus ipse, ejusque compositio? Recte poeta;

——— Nec vultu destrue verba tuo.[1]

Poterit enim quis vim orationis Vultu labefactare, et plane prodere. Quin et Facta, non minus quam Verba, Vultu pariter destrui possint, si Ciceroni credamus; qui, cum fratri affabilitatem commendaret erga provinciales, non in hoc eam potissimum sitam dixit, ut aditus præberet ad se faciles, nisi etiam vultu ipso comiter accedentes exciperet; *Nil interest habere ostium apertum, vultum clausum.*[2] Videmus quoque Atticum, sub primum Ciceronis cum Cæsare congressum, bello adhuc fervente, diligenter et serio Ciceronem per epistolam monuisse de Vultu et Gestu ad dignitatem et gravitatem componendis.[3] Quod si tantum possit Oris et Vultus solius moderatio, quanto magis Sermo familiaris, et alia quæ ad Conversationem pertinent? Atque sane summa et compendium

[1] Ovid, De Arte Am. ii. 312.

[2] No such remark occurs in the letter of advice which Marcus Cicero wrote to his brother Quintus, when the latter was about to take possession of his province. But in Quintus's tract *De Petitione Consulatûs*, in which he gives his brother advice as to his conduct in canvassing for the consulship, we find the antithesis quoted in the text, though somewhat differently worded. But of course the passage in which it occurs has no reference to any class of "provinciales."

[3] See Cicero, Ep. ad Att. ix. 12.; and compare the eighteenth letter of the same book, in which the interview with Cæsar is described.

decori et elegantiæ morum in hoc fere sita sunt, ut quasi æqua lance et propriam dignitatem et aliorum metiamur et tueamur; quod etiam non male expressit T. Livius (licet alii rei intentus) eo personæ charactere: *Ne* (inquit) *aut arrogans videar, aut obnoxius; quorum alterum est alienæ libertatis obliti, alterum suæ.*[1] Ex contraria vero parte, si Urbanitati et elegantiæ morum externæ impensius studeamus, transeunt illæ in affectationem quandam deformem et adulterinam; *Quid enim deformius, quam scenam in vitam transferre?* Quinetiam, licet in excessum illum vitiosum minime prolabantur, temporis tamen nimium in hujusmodi leviculis absumitur; animusque ad curam ipsarum, magis quam oportet, deprimitur. Ideoque sicut in academiis adolescentes literarum studiosi, at sodalium congressibus plus satis indulgentes, moneri soleant a præceptoribus, *Amicos esse fures temporis;* sic certe assidua ista in Conversationis decorum animi intentio magnum gravioribus meditationibus furtum facit. Deinde, qui primas adeo in Urbanitate obtinent et ad hanc rem unam quasi nati videntur, hoc fere habent, ut sibi ipsis in illa sola complaceant, et ad virtutes solidiores et celsiores vix unquam aspirent; quando e contra, qui sibi in hac parte defectus sunt conscii, decus ex bona existimatione quærunt; ubi enim adest bona existimatio, omnia fere decent; ubi vero illa deficit, tum demum a commoditate morum atque Urbanitate subsidium petendum est. Porro, ad res gerendas vix gravius aut frequentius reperias impedimentum, quam hujusce decori externi curiosam nimis observationem; atque illud alterum, quod huic ipsi inservit; nimirum anxiam temporis atque opportunitatum electionem. Egregie enim Salomon: *Qui respicit ad ventos, non seminat; qui respicit ad nubes, non metit*[2]: creanda siquidem nobis est opportunitas, sæpius quam opperienda. Ut verbo dicamus, urbana ista morum compositio veluti vestis animi est, et proinde vestis commoditates referre debet. Primum enim talis esse debet, ut sit in usu communi; rursus, ut non sit nimis delicata aut sumptuosa; deinde ita conficienda, ut si qua sit in animo virtus, eam exhibeat maxime conspicuam; si qua deformitas, eandem suppleat et occultet; postremo, et super omnia, ne sit nimis

[1] Liv. xxiii. 12. The original stands thus: "Si reticeam aut superbus aut obnoxius videar," and then as in the text. Compare with this maxim of Bacon's the precept which Fenelon has given in the *Lettres Spirituelles.*

[2] Ecclesiast. xi. 4.

arcta, atque ita animum angustiet ut ejusdem motus in rebus gerendis cohibeat et impediat. Verum hæc pars Scientiæ Civilis de Conversatione eleganter profecto a nonnullis tractata est, neque ullo modo tanquam Desiderata reponi debet.

CAPUT II.

Partitio Doctrinæ de Negotiis in Doctrinam de Occasionibus Sparsis, *et Doctrinam de* Ambitu Vitæ. *Exemplum Doctrinæ de Occasionibus Sparsis, ex Parabolis aliquibus Salomonis. Præcepta de Ambitu Vitæ.*

Doctrinam de Negotiis partiemur in Doctrinam de Occasionibus Sparsis, et Doctrinam de Ambitu Vitæ; quarum altera universam negotiorum varietatem complectitur, et vitæ communis tanquam *amanuensis* est; altera ea tantum quæ ad propriam cujusque fortunam amplificandam spectant excerpit et suggerit, quæ singulis pro intimis quibusdam rerum suarum tabellis aut codicillis esse possint. Verum antequam ad species descendamus, aliquid circa Doctrinam de Negotiis in genere præfabimur. Doctrinam de Negotiis pro rei momento tractavit adhuc nemo, cum magna tam literarum quam literatorum existimationis jactura. Ab hac enim radice pullulat illud malum, quod notam eruditis inussit; nimirum, *eruditionem et prudentiam civilem raro admodum conjungi.* Etenim si quis recte advertat ex Prudentiis illis tribus quas modo diximus ad vitam civilem spectare, illa Conversationis ab eruditis fere contemnitur, tanquam servile quiddam, atque insuper meditationibus inimicum. Quod vero ad illam de Republica Administranda, sane si quando rerum gubernaculis admoveantur eruditi, munus suum non incommode sustinent; verum ea promotio contingit paucis. De Prudentia autem Negotiandi (qua de nunc loquimur) in qua vita humana plurimum versatur, nulli omnino libri conscripti habentur; præter pauca quædam Monita Civilia in fasciculum unum aut alterum collecta, quæ amplitudini hujus subjecti nullo modo respondent. Etenim si libri aliqui extarent de hoc argumento, sicut de cæteris, minime dubitaverim quin viri eruditi, aliquo experientiæ manipulo instructi, ineruditos, licet diutina experientia edoctos, longe superarent, et *proprio illorum* (quod dicitur) *arcu usi* magis e longinquo ferirent.

Neque vero est cur vereamur ne Scientiæ hujus tam varia sit materia, ut sub præceptionibus non cadat: multo siquidem angustior est quam illa Reipublicæ Administrandæ scientia, quam tamen apprime videmus excultam. Hujus generis Prudentiæ apud Romanos, optimis temporibus, extitisse videntur nonnulli professores. Testatur enim Cicero moris fuisse, paulo ante sua sæcula, ut Senatores prudentia et rerum usu maxime celebres (Coruncanii, Curii, Lælii, et alii) statis horis in foro deambularent, ubi civibus copiam sui facerent, et consulerentur, non de jure, sed de negotiis omnigenis; veluti de filia elocanda, sive de filio educando, sive de prædio coëmendo, de contractu, accusatione, defensione, aut alia quacunque re quæ in vita communi interveniat.[1] Ex quo liquet, prudentiam quandam esse consilium dandi, etiam in negotiis privatis, ex universali rerum civilium cognitione et experientia promanantem; quæ exerceatur quidem in casibus particularibus, extrahatur autem ex generali casuum consimilium observatione. Sic enim videmus in eo libro quem ad fratrem conscripsit Q. Cicero *de Petitione Consulatus* (quem unicum a veteribus habemus, quantum memini, tractatum de Negotio aliquo Particulari)[2] quanquam ad consilium dandum de re tum præsenti potissimum spectaret, plurima tamen contineri axiomata politica, quæ non usum solum temporarium, sed normam quandam perpetuam circa electiones populares præscribant. In hoc genere autem nihil invenitur quod ullo modo comparandum sit cum Aphorismis illis quos edidit rex Salomon, de quo testatur Scriptura, *Cor illi fuisse instar arenæ maris*[3]; sicut enim arenæ maris universas orbis oras circundant, ita et sapientia ejus omnia humana non minus quam divina complexa est. In Aphorismis vero illis, præter alia magis theologica, reperies liquido haud pauca præcepta et monita civilia præstantissima; ex profundis quidem sapientiæ penetralibus scaturientia, atque in amplissimum varietatis campum excurrentia. Quoniam vero Doctrinam de Occasionibus Sparsis (quæ Doctrinæ de Negotiis portio est prior) inter Desiderata reponemus, ex more nostro paulisper in illa immorabimur; atque exemplum

[1] Cicero, de Orat. iii. 33.

[2] Frontinus's tract *De Aquæductibus* belongs to the same class. Its chief object is to give an account of the regulations affecting the Roman aqueducts, and of the frauds which, on his appointment as Curator Aquarum, his examinations of the Castella, &c., enabled him to detect.

[3] 1 Kings, iv. 29.

ejusdem ex Aphorismis sive Parabolis illis Salomonis desumptum proponemus. Neque vero quis ut arbitramur nos merito sugillare possit, quod ex scriptoribus Sacræ Scripturæ aliquem ad sensum politicum trahamus. Equidem existimo, si extarent commentarii illi Salomonis ejusdem de Natura Rerum (in quibus *de omni vegetabili, a musco super murum ad cedrum Libani,* itemque de *animalibus,* conscripsit)[1] non illicitum esse eos secundum sensum naturalem interpretari; quod idem nobis liceat in Politicis.

Exemplum portionis doctrinæ de Occasionibus sparsis, *ex parabolis aliquibus Salomonis.*

PARABOLA.

1. *Mollis responsio frangit iram.*[2]

EXPLICATIO.

Si incendatur ira principis vel superioris adversus te, et tuæ jam sint loquendi partes, duo præcipit Salomon: alterum, ut fiat responsio; alterum, ut eadem sit mollis. Prius continet tria præcepta. Primo, ut caveas a silentio tristi et contumaci; illud enim aut culpam totam in te recipit, ac si nihil habeas quod respondere possis; aut dominum occulte iniquitatis insimulat, ac si aures ejus defensioni licet justæ non paterent. Secundo, ut caveas a re comperendinanda, neque tempus aliud ad defensionem postules; hoc enim aut eandem notam inurit quam prius (nimirum dominum tuum nimia mentis perturbatione efferri), aut plane significat te artificiosam quandam defensionem meditari, cum in promptu nihil habeas; adeo ut optimum semper fuerit, aliquid in præsentia et e re nata in excusationem tui adducere. Tertio, ut fiat prorsus responsio; *responsio* (inquam) non mera *confessio* aut mera *submissio;* sed aliquid apologiæ et excusationis inspergatur. Neque enim aliter tutum est facere, nisi apud ingenia valde generosa et magnanima, quæ rara admodum sunt. Sequitur posteriore loco, ut responsio sit mollis, minime præfracta aut aspera.

PARABOLA.

2. *Servus prudens dominabitur in filium stultum; et partietur hæreditatem inter fratres.*[3]

[1] 1 Kings, iv. 33. [2] Prov. xv. 1. [3] Ib. xvii. 2.

EXPLICATIO.

In omni familia turbata et discordi, semper exurgit aliquis servus aut humilis amicus præpotens, qui pro arbitro se gerat ad lites familiæ componendas; cuique eo nomine et familia tota et dominus ipse sunt obnoxii. Ille, si suam rem agat, familiæ mala fovet et aggravat; sin fidelis revera fuerit et integer, plurimum certe meretur; adeo ut etiam tanquam inter fratres haberi debeat, aut saltem procurationem hæreditatis accipere fiduciariam.

PARABOLA.

3. *Vir sapiens, si cum stulto contenderit, sive irascatur sive rideat, non inveniet requiem.*[1]

EXPLICATIO.

Monemur sæpius, ut congressum imparem fugiamus; eo sensu, ne cum potioribus decertemus. At haud minus utile est monitum, quod hic exhibet Salomon, Ne cum indigno contendamus. Iniqua enim prorsus sorte hæc res transigitur. Siquidem, si superiores simus, nulla sequitur victoria; si superemur, magna indignitas. Neque juvat etiam, in hujusmodi contentione exercenda, si interdum veluti per jocum agamus, interdum cum fastu et contemptu. Nam quocunque nos vertamus, leviores inde efficiemur, neque commode nos explicabimus. Pessime autem fit, si hujusmodi persona quacum contendimus (ut Salomon loquitur) aliquid affine habeat cum stulto; hoc est, si sit audaculus et temerarius.

PARABOLA.

4. *Sed et cunctis sermonibus, qui dicuntur, ne accommodes aurem tuam, ne forte audias servum tuum maledicentem tibi.*[2]

EXPLICATIO.

Vix credi possit, vitam quantum perturbet inutilis curiositas circa illas res quæ nostra intersunt: nimirum, quando secreta illa rimari satagimus quæ detecta et inventa ægritudinem quidem animo inferant, ad consilia autem expedienda nihil juvent. Primo enim sequitur animi vexatio et inquietudo, cum humana omnia perfidiæ et ingratitudinis plena sint. Adeo ut, si comparari possit speculum aliquod magicum, in quo odia et quæcunque contra nos ullibi commoventur intueri possemus, melius nobis foret si protinus projiceretur et collideretur. Hujusmodi enim res veluti foliorum murmura sunt, et brevi evanescunt.

[1] Prov. xxix. 9. [2] Eccles. vii. 21.

Secundo, curiositas illa animum suspicionibus nimiis onerat, quod consiliis inimicissimum est eaque reddit inconstantia et complicata. Tertio, eadem mala ipsa sæpissime figit, alias prætervolatura. Grave enim est conscientias hominum irritare; qui, si latere se putent, facile mutantur in melius; sin deprehensos se sentiant, malum malo pellunt. Merito igitur summæ prudentiæ tribuebatur Pompeio Magno, quod Sertorii chartas universas, nec a se perlectas nec aliis permissas, igni protinus dedisset.[1]

PARABOLA.

5. *Advenit veluti viator pauperies; et egestas quasi vir armatus.*[2]

EXPLICATIO.

Eleganter describitur in Parabola, quomodo prodigis et circa rem familiarem incuriosis superveniant naufragia fortunarum. A principio enim pedetentim et passibus lentis, instar viatoris, advenit obæratio et sortis diminutio, neque fere sentitur; at non multo post invadit egestas, tanquam vir armatus, manu scilicet tam forti et potente ut ei amplius resisti non possit; cum apud antiquos recte dictum sit, *Necessitatem ex omnibus rebus esse fortissimam.*[3] Itaque viatori occurrendum, contra armatum muniendum.

PARABOLA.

6. *Qui erudit derisorem, ipse sibi injuriam facit; et qui arguit impium, sibi maculam generat.*[4]

EXPLICATIO.

Congruit cum præcepto Salvatoris, *ut non mittamus margaritas nostras ante porcos.* Distinguuntur autem in hac Parabola actiones præceptionis et reprehensionis; distinguuntur itidem personæ derisoris et impii; distinguitur postremo id quod rependitur; in priore enim rependitur opera lusa; in posteriore, etiam et macula. Cum enim quis erudit et instituit derisorem, jactura primum fit temporis; deinde, et alii conatum irrident, tanquam rem vanam et operam male collocatam; postremo, derisor ipse scientiam quam didicit fastidio habet. At majore cum periculo transigitur res in reprehensione impii; quia non solum impius non auscultat, sed et cornua obvertit, et

[1] See Plutarch, in Pomp. c. 20., and in Sertor. c. 27.

[2] Prov. vi. 11., xxiv. 34.

[3] λόγος γάρ ἐστιν οὐκ ἐμὸς, σοφῶν δ' ἔπος,
δεινῆς ἀνάγκης οὐδὲν ἰσχύειν πλέον. EURIP. *Helena*, 513.
Cf. Erasm. Adagia, ii. 3. 41.

[4] Prov. ix. 7.

reprehensorem, odiosum sibi jam factum, aut confestim convitiis proscindit, aut saltem postea apud alios criminatur.

PARABOLA.

7. *Filius sapiens lætificat patrem: filius vero stultus mœstitiæ est matri suæ.*[1]

EXPLICATIO.

Distinguuntur solatia atque ægritudines œconomicæ, patris videlicet et matris, circa liberos suos. Etenim filius prudens et frugi præcipuo solatio est patri, qui virtutis pretium melius novit quam mater; ac propterea filii sui indoli ad virtutem propensæ magis gratulatur; quinetiam gaudium illi fortasse affert institutum suum, quod filium tam probe educarit, illique honestatem morum præceptis et exemplo impresserit. E contra, mater calamitati filii plus compatitur et indolet; tum ob affectum maternum magis mollem et tenerum, tum fortasse indulgentiæ suæ conscia, qua eum corruperit et depravaverit.

PARABOLA.

8. *Memoria Justi cum laudibus; at nomen Impiorum putrescet.*[2]

EXPLICATIO.

Distinguitur inter famam virorum bonorum et malorum, qualis esse soleat post obtium. Viris enim bonis, extincta invidia (quæ famam eorum, dum vixerant, carpebat), nomen continuo efflorescit, et laudes magis indies invalescunt; at viris malis (licet fama eorum, per gratiam amicorum et factionis suæ hominum, ad breve tempus manserit) paulo post fastidium nominis oboritur; et postremo laudes illæ evanidæ in infamiam et veluti in odorem gravem et tetrum desinunt.

PARABOLA.

9. *Qui conturbat domum suam, possidebit ventos.*[3]

EXPLICATIO.

Utile admodum monitum, de discordiis et turbis domesticis. Plurimi enim ex dissidiis uxorum, aut exhæredationibus filiorum, aut mutationibus frequentibus familiæ, magna sibi spondent; ac si inde vel animi tranquillitas, vel rerum suarum administratio fœlicior, sibi obventura foret. Sed plerunque abeunt spes suæ in ventos. Etenim tum mutationes illæ, ut plurimum, non cedunt in melius; tum etiam perturbatores isti familiæ suæ molestias varias, et ingratitudinem eorum quos

[1] Prov. x. 1. [2] Prov. x. 7. [3] Prov. xi. 29.

aliis præteritis adoptant et deligunt, sæpenumero experiuntur; quin et hoc pacto rumores sibi progignunt non optimos, et famas ambiguas; neque enim male a Cicerone notatum est; *Omnem famam a domesticis manare.*[1] Utrunque autem malum per *ventorum possessionem* eleganter a Salomone exprimitur; nam expectationis frustratio, et rumorum suscitatio, ventis recte comparantur.

PARABOLA.

10. *Melior est finis orationis, quam principium.*[2]

EXPLICATIO.

Corrigit Parabola errorem frequentissimum, non solum apud eos qui verbis præcipue student, verum etiam apud prudentiores. Is est, quod homines de sermonum suorum aditu atque ingressu magis sint soliciti quam de exitu; et accuratius exordia et præfatiunculas meditentur quam extrema orationum. Debuerant autem nec illa negligere, et ista, ut longe potiora, præparata et digesta apud se habere; revolventes secum, et quantum fieri potest animo prospicientes, quis tandem exitus sermonis sit futurus, et quomodo negotia inde promoveri et maturari possint. Neque hic finis. Quinimo non epilogos tantum et sermonum qui ad ipsa negotia spectant egressus meditari oportet; verum etiam et illorum sermonum cura suscipienda quos sub ipsum discessum commode et urbane injicere possint, licet a negotio prorsus alienos. Equidem cognovi consiliarios duos, viros certe magnos et prudentes, et quibus onus rerum tunc præcipue incumbebat, quibus illud fuit perpetuum et proprium, ut quoties cum principibus suis de negotiis ipsorum communicarent, colloquia in rebus ad ipsa negotia spectantibus nunquam terminarent; verum semper aut ad jocum, aut aliud aliquid quod audire erat volupe, diverticula quærerent; atque (ut adagio dicitur) *sermones marinos aqua fluviatili sub extremum abluerent.*[3] Neque hoc illis inter artes postremum erat.

PARABOLA.

11. *Sicut muscæ mortuæ fœtere faciunt unguentum optimum, sic hominem pretiosum sapientia et gloria, parva stultitia.*[4]

[1] Q. Cicero, De Pet. Cons. § 5.
[2] Eccles. vii. 8. The English version differs considerably from the Vulgate.
[3] Erasm. Adag. iii. 3. 26. This proverbial phrase Erasmus found in the *Phædrus* of Plato, and in Athenæus.
[4] Eccles. x. 1.

EXPLICATIO.

Iniqua admodum et misera est conditio hominum virtute præcellentium (ut optime notat Parabola), quia erroribus eorum, quantumvis levissimis, nullo modo ignoscitur; verum, quemadmodum in gemma valde nitida minimum quodque granulum aut nubecula oculos ferit et molestia quadam afficit, quod tamen si in gemma vitiosiore repertum foret, vix notam subiret; similiter in viris singulari virtute præditis minima quæque vitia statim in oculos et sermones hominum incurrunt, et censura perstringuntur graviore; quæ in hominibus mediocribus aut omnino laterent aut veniam facile reperirent. Itaque viro valde prudenti parva stultitia, valde probo parvum peccatum, urbano et moribus eleganti paululum indecori, de fama et existimatione multum detrahit. Adeo ut non pessimum foret viris egregiis, si nonnulla absurda (quod citra vitium fieri possit) actionibus suis immiscerent, ut libertatem quandam sibi retineant, et parvorum defectuum notas confundant.

PARABOLA.

12. *Homines derisores civitatem perdunt; sapientes vero avertunt calamitatem.*[1]

EXPLICATIO.

Mirum videri possit quod in descriptione hominum qui ad respublicas labefactandas et perdendas veluti natura comparati et facti sunt, delegerit Salomon characterem, non hominis superbi et insolentis; non tyrannici et crudelis; non temerarii et violenti; non impii et scelerati; non injusti et oppressoris; non seditiosi et turbulenti; non libidinosi et voluptarii; non denique insipientis et inhabilis; sed *derisoris*. Verum hoc sapientia ejus regis, qui rerumpublicarum conservationes et eversiones optime norat, dignissimum est. Neque enim similis fere est pestis regnis et rebuspublicis, quam si consiliarii regum aut senatores, quique gubernaculis rerum admoventur, sint ingenio derisores. Hujusmodi enim homines periculorum magnitudinem, ut fortes videantur senatores, semper extenuant; iisque qui pericula prout par est ponderant, veluti timidis insultant. Consultandi et deliberandi maturas moras, et meditatas disceptationes, veluti rem oratoriam et tædii plenam et ad summas rerum nihil facientem, subsannant. Famam, ad quam principum consilia præcipue sunt componenda, ut *salivam vulgi*

[1] Prov. xxix. 8.

et rem cito prætervolaturam, contemnunt. Legum vim et authoritatem, ut reticula quædam quibus res majores minime cohiberi debeant, nil morantur. Consilia et præcautiones in longum prospicientes, ut somnia quædam et apprehensiones melancholicas, rejiciunt. Viris revera prudentibus et rerum peritis atque magni animi et consilii, dicteriis et facetiis illudunt. Denique fundamenta omnia regiminis politici simul labefactant.[1] Quod magis attendendum est, quia cuniculis et non impetu aperto hæc res agitur, neque cœpit esse inter homines (prout meretur) suspecta.

PARABOLA.

13. *Princeps qui libenter præbet aures verbis mendacii, omnes servos habet improbos.*[2]

EXPLICATIO.

Cum princeps talis fuerit, ut susurronibus et sycophantis absque judicio faciles et credulas aures præbeat, spirat omnino tanquam a parte regis aura pestilens quæ omnes servos ejus corrumpit et inficit. Alii metus principis rimantur, eosque narrationibus fictitiis exaggerant; alii invidiæ furias concitant, præsertim in optimos quosque; alii criminationibus aliorum proprias sordes et conscientias malas eluunt; alii amicorum suorum honoribus et desideriis velificant, competitores eorum calumniando et mordendo; alii fabularum argumenta contra inimicos suos, tanquam in scena, componunt; et innumera hujusmodi. Atque hæc illi qui ex servis principis ingenio sunt magis improbo. At illi etiam qui natura probiores sunt et melius morati, postquam in innocentia sua parum præsidii esse senserint (quoniam princeps vera a falsis distinguere non novit), morum suorum probitatem exuunt, et ventos aulicos captant, iisque servilem in modum circumferuntur. *Nihil enim* (ut ait Tacitus de Claudio) *tutum est apud principem cujus animo omnia sunt tanquam indita et jussa.*[3] Atque bene Comineus; *Præstat servum esse principis cujus suspicionum non est finis, quam ejus cujus credulitatis non est modus.*[4]

[1] These remarks may remind the reader of Beranger's sarcasm:

"Un favori
Qui se croyait un grand ministre
Quand de nos maux il avait ri." *Les Etoiles Filantes.*

[2] Prov. xxix. 12.

[3] "Sed nihil arduum videbatur in animo principis cui non judicium non odium erat nisi indita et jussa."— *Tac. Ann.* xii. 3.

[4] See Philip de Comines's Memoirs, book i. c. 16.

PARABOLA.

14. *Justus miseretur animæ jumenti sui; sed misericordiæ impiorum crudeles.*[1]

EXPLICATIO.

Inditus est ab ipsa natura homino Misericordiæ affectus nobilis et excellens; qui etiam ad animalia bruta extenditur, quæ ex ordinatione divina ejus imperio subjiciuntur. Itaque habet ista misericordia analogiam quandam cum illa principis erga subditos. Quinetiam illud certissimum est, quod quo dignior est anima, eo pluribus compatiatur. Etenim animæ augustæ et degeneres hujusmodi res ad se nihil pertinere putant; at illa quæ nobilior est portio universi, ex communione afficitur. Quare videmus sub veteri lege haud pauca fuisse præcepta, non tam mere cæremonialia, quam misericordiæ institutiva; quale fuit illud de *non comedendo carnem cum sanguine ejus;* et similia. Etiam in sectis Essæorum et Pythagoræorum ab esu animalium omnino abstinebant. Quod etiam hodie obtinet (superstitione inviolata) apud incolas nonnullos imperii Mogollensis. Quin et Turcæ (gens licet et stirpe et disciplina crudelis et sanguinaria) brutis tamen eleemosynas largiri solent; neque animalium vexationes et torturas fieri sustinent.[2] Verum, ne forte hæc quæ diximus omnis generis misericordiæ patrocinari videantur, salubriter subjungit Salomon; *Impiorum misericordias esse crudeles.* Eæ sunt, quando hominibus sceleratis e facinorosis parcitur justitiæ gladio feriendis; crudelior enim hujusmodi misericordia, quam crudelitas ipsa. Nam crudelitas exercetur in singulos, at misericordia illa universum facinorosorum exercitum, concessa impunitate, in homines innocentes armat et immittit.

PARABOLA.

15. *Totum spiritum suum profert stultus; at sapiens reservat aliquid in posterum.*[3]

EXPLICATIO.

Corrigit Parabola præcipue (ut videtur) non hominum vanorum futilitatem, qui dicenda tacenda facile proferunt; non parrhesiam illam, qua absque discrimine et judicio in omnes et

[1] Prov. xii. 10. Bacon seems here to translate from the English version. The Vulgate is, "Novit justus jumentorum suorum animas; viscera autem impiorum crudelia."

[2] See Busbequius, Ep. 3.—*J. S.*

[3] Prov. xxix. 11.

omnia involant; non garrulitatem, qua ad nauseam usque aliis obstrepunt; sed vitium aliud magis occultum; nempe sermonis regimen minime omnium prudens et politicum; hoc est, cum quis ita sermonem (in colloquiis privatis) instituit, ut quæcunque in animo habeat quæ ad rem pertinere putet, simul, et tanquam uno spiritu et oratione continuata, proferat. Hoc enim plurimum negotiis officit. Siquidem primo, oratio intercisa et per partes infusa longe magis penetrat quam continuata; quoniam in continuata pondus rerum non distincte et sigillatim excipitur, nec per moram nonnullam insidet, sed ratio rationem antequam penitus insederit expellit. Secundo, nemo tam potenti et fœlici eloquentia valet, ut primo sermonis impetu eum quem alloquitur mutum et elinguem plane reddat; quin et alter aliquid vicissim respondebit, et fortasse objiciet: tum vero accidit, ut quæ in refutationem aut replicationem reservanda fuissent, præmissa jam et antea delibata vires suas et gratiam amiserint. Tertio, si quis ea quæ dicenda sunt non simul effundat sed per partes eloquatur, aliud primo aliud subinde injiciens, sentiet ex ejus quem alloquitur vultu et responso quomodo singula illum affecerint, quam in partem accepta fuerint; ut quæ adhuc restant dicenda cautius aut supprimat aut excerpat.

PARABOLA.

16. *Si spiritus potestatem habentis ascenderit super te, locum tuum ne dimiseris; quia curatio faciet cessare magna peccata.*[1]

EXPLICATIO.

Præcipit Parabola quomodo se quis gerere debeat, cum iram atque indignationem principis incurrerit. Præceptum duplex: primo, ut non dimittat locum suum; secundo, ut curationi, tanquam in morbo aliquo gravi, diligenter et caute attendat. Consueverunt enim homines, postquam commotos contra se principes suos senserint, partim ex dedecoris impatientia, partim ne vulnus observando refricent, partim ut tristitiam et humilitatem eorum principes sui perspiciant, se a muneribus et functionibus suis subducere; quinetiam interdum ipsos magistratus et dignitates quas gerunt in principum manus restituere. At Salomon hanc medendi viam, veluti noxiam, improbat; idque summa profecto ratione. Primo enim, dedecus ipsum nimis illa publicat; unde tum inimici atque invidi audaciores fiunt ad lædendum, tum amici timidiores ad subveniendum. Secundo, hoc pacto

[1] Eccles. x. 4.

fit ut principis ira, quæ fortasse si non evulgaretur sponte concideret, magis figatur, et veluti principio jam facto hominis deturbandi in præcipitium illius feratur. Postremo, secessus iste aliquid sapit ex malevolo, et temporibus infenso; id quod malum indignationis malo suspicionis cumulat. Ad curationem autem pertinent ista: primo, caveat ante omnia ne stupiditate quadam, aut etiam animi elatione, indignationem principis minime sentire aut inde prout debeat affici videatur: hoc est, ut et vultum, non ad tristitiam contumacem, sed ad mœstitiam gravem atque modestam componat; et in rebus quibuscunque agendis se minus solito hilarem et lætum ostendat; quin et in rem suam erit, amici alicujus opera et sermone apud principem uti, qui quanto doloris sensu in intimis excrucietur tempestive insinuet. Secundo, occasiones omnes vel minimas sedulo evitet, per quas aut res ipsa quæ indignationi causam præbuit refricetur, aut princeps denuo excandescendi et ipsum quacunque de causa coram aliis objurgandi ansam arripiat. Tertio, perquirat etiam diligenter occasiones omnes, in quibus opera ejus principi grata esse possit; ut et voluntatem promptam redimendi culpam præteritam ostendat, et princeps suus sentiat quali tandem servo, si eum dimittat, privari se contigerit. Quarto, culpam ipsam aut sagaciter in alios transferat, aut animo illam non malo commissam esse insinuet, aut etiam malitiam illorum, qui ipsum regi detulerunt vel rem supra modum aggravarunt, indicet. Denique in omnibus evigilet, et curationi sit intentus.

PARABOLA.

17. *Primus in causa sua justus; tum venit altera pars, et inquirit in eum.*[1]

EXPLICATIO.

Prima in unaquaque causa informatio, si paulisper animo judicis insederit, altas radices agit, eumque imbuit et occupat; adeo ut ægre elui possit, nisi aut manifesta aliqua falsitas in materia informationis, aut artificium aliquod in eadem exhibenda deprehendatur. Etenim nuda et simplex defensio, licet justa sit et præponderans, vix præjudicium informationis primæ compensare, aut libram justitiæ semel propendentem ad æquilibrium reducere per se valet. Itaque et judici tutissimum ut nihil quod ad merita causæ spectat prælibetur priusquam utraque

[1] Prov. xviii. 17.

pars simul audiantur; et defensori optimum, si judicem senserit præoccupatum, in hoc potissimum (quantum dat causa) incumbere, ut versutiam aliquam et dolum malum ab adversa parte in judicis abusum adhibitum detegat.

PARABOLA.

18 *Qui delicate a pueritia nutrit servum suum, postea sentiet eum contumacem.* [1]

EXPLICATIO.

Servandus est principibus et dominis, ex consilio Salomonis, in gratia et favore suo erga servos, modus. Is triplex est; primo, *ut promoveantur per gradus, non per saltus;* secundo, ut *interdum assuefiant repulsæ;* tertio (quod bene præcipit Macciavellus[2]) *ut habeant præ oculis suis semper aliquid, quo ulterius aspirare possint.* Nisi enim hæc fiant, reportabunt proculdubio principes in fine a servis suis, loco animi grati et officiosi, fastidium et contumaciam. Etenim, ex promotione subita, oritur insolentia; ex perpetua desideratorum adeptione, impatientia repulsæ; denique, si vota desint, deerit itidem alacritas et industria.

PARABOLA.

19. *Vidisti virum velocem in opere suo; coram regibus stabit, nec erit inter ignobiles.*[3]

EXPLICATIO.

Inter virtutes quas reges in delectu servorum potissimum spectant et requirunt, gratissima est præ cunctis celeritas et in negotiis expediendis strenuitas. Viri profunda prudentia, regibus suspecti; utpote qui nimium sint inspectores, et dominos suos inscios et invitos ingenii sui viribus (tanquam machina) circumagere possint. Populares, invisi; utpote qui regum luminibus officiunt, et oculos populi in se convertunt. Animosi, pro turbulentis sæpe habentur, et ultra quam par est ausuris. Probi, et vitæ integræ, tanquam difficiles existimantur, nec ad omnes nutus heriles apti. Denique non est virtus alia, quæ non habeat aliquam quasi umbram, qua regum animi offendantur; sola velocitas ad mandata nihil habet quod non placeat.

[1] Prov. xxix. 21.

[2] We find Macchiavelli's opinion, as to what the conduct of princes towards their ministers ought to be, in the twenty-second chapter of *Il Principe.* It hardly appears to justify the reference here made to him; but I have not met with any passage in his writings which contains precisely the remark in the text.

[3] Prov. xxii. 29.

Insuper, motus animorum regiorum celeres sunt, et moræ minus patientes. Putant enim se quidvis efficere posse; illud tantum deesse, ut cito fiat. Itaque ante omnia iis grata est celeritas.

PARABOLA.

20. *Vidi cunctos viventes, qui ambulant sub sole, cum adolescente secundo, qui consurgit pro eo.*[1]

EXPLICATIO.

Notat Parabola vanitatem hominum, qui se agglomerare solent ad successores designatos principum. Radix autem hujus rei est insania illa, hominum animis penitus a natura insita; nimirum, ut Spes suas nimium adament. Vix enim reperitur, qui non delectatur magis iis quæ sperat, quam iis quæ fruitur. Quinetiam Novitas humanæ naturæ grata est, et avide expetitur. In successore autem principis ista duo concurrunt; Spes, et Novitas. Innuit autem Parabola idem quod olim dictum erat, primo a Pompeio ad Syllam, postea a Tiberio de Macrone; *Plures adorare solem orientem, quam occidentem.*[2] Neque tamen imperantes multum hac re commoventur aut eam magni faciunt, sicut nec Sylla nec Tiberius fecit; sed rident potius hominum levitatem, nec pugnant cum somniis: *Est autem*, ut aiebat ille, *Spes vigilantis insomnium.*[3]

PARABOLA.

21. *Erat civitas parva, et pauci in ea viri. Venit contra eam rex magnus, et vadavit eam, instruxitque munitiones per gyrum, et perfecta est obsidio; inventusque est in ea vir pauper et sapiens, et liberavit eam per sapientiam suam; et nullus deinceps recordatus est hominis illius pauperis.*[4]

EXPLICATIO.

Describit Parabola ingenium hominum pravum et malevolum. Ii in rebus duris et angustis confugiunt fere ad viros prudentes et strenuos, licet antea contemptui habitos. Quamprimum autem tempestas transierit, ingrati demum erga conservatores suos reperiuntur. Macciavellus vero, non sine causa, instituit quæstionem; *Uter ingratior esset erga bene meritos, princeps aut populus?*[5] Sed interim utrunque ingra-

[1] Eccles. iv. 15. The English version differs considerably from the Vulgate.

[2] Plut. in Pomp. c. 22., and Tacitus, Annal. vi. 46.

[3] "Otia animorum et spes inanes et velut somnia quædam vigilantium."— *Quintil.* vi. 2. 30. The apophthegm in the text is ascribed to Plato by Ælian, *Var. Hist.* xiii. 28. M. Bouillet refers to *Ecclesiasticus*, xiii. 13.

[4] Eccles. ix. 14, 15.

[5] Macch. Discorsi, i. 29.

titudinis arguit. Attamen hoc non solum ex ingratitudine principis aut populi oritur, sed accedit plerunque his invidia procerum, qui secreto indolent eventui, licet fœlici et prospero, quia ab ipsis profectus non sit; itaque et meritum hominis extenuant et ipsum deprimunt.

PARABOLA.

22. *Iter pigrorum quasi sepes spinarum.*[1]

EXPLICATIO.

Elegantissime ostendit Parabola Pigritiam in fine laboriosam esse. Diligentia enim et sedula præparatio id præstant, ut pes in aliquod offendiculum non impingat, sed ut complanetur via antequam ineatur. At qui piger est et omnia in extremum momentum executionis differt, necesse est ut perpetuo et singulis passibus quasi per rubos et sentes incedat, qui eum subinde detineant et impediant. Idem observari possit etiam in familia regenda; in qua si adhibeatur cura et providentia, omnia placide et veluti sponte procedunt, absque strepitu et tumultu; sin hæc desint, ubi major aliquis motus intervenerit, omnia simul agenda turmatim occurrunt; tumultuantur servi; ædes personant.

PARABOLA.

23. *Qui cognoscit in judicio faciem, non bene facit; iste, et pro buccella panis, deseret veritatem.*[2]

EXPLICATIO.

Prudentissime notat Parabola, in judice magis perniciosam esse facilitatem morum quam corruptelam munerum. Munera enim haudquaquam ab omnibus deferuntur; at vix ulla est causa, in qua non inveniatur aliquid quod flectat judicis animum, si personas respiciat. Alius enim respicietur, ut popularis; alius, ut maledicus; alius, ut dives; alius, ut gratus; alius, ut ab amico commendatus; denique omnia plena sunt iniquitatis, ubi dominatur respectus personarum; et levi omnino de causa, veluti pro *buccella panis*, judicium pervertetur.

PARABOLA.

24. *Vir pauper calumnians pauperes similis est imbri vehementi in quo paratur fames.*[3]

EXPLICATIO.

Parabola ista antiquitus expressa et depicta fuit sub fabula hirudinis utriusque; nimirum, plenæ et vacuæ. Pauperis

[1] Prov. xv. 19. [2] Prov. xxviii. 21. [3] Prov. xxviii. 3.

enim et famelici oppressio longe gravior est quam oppressio per divitem et repletum, quippe quæ omnes exactionum technas et omnes nummorum angulos perquirit. Solebat hoc ipsum etiam spongiis assimilari; quæ aridæ fortiter sugunt, madidæ non item. Monitum autem utile continet, tum erga principes, ne præfecturas provinciarum aut magistratus viris indigentibus et obæratis committant; tum erga populos, ne reges suos cum nimia egestate conflictari permittant.

PARABOLA.

25. *Fons turbatus pede, et vena corrupta, est justus cadens coram impio.*[1]

EXPLICATIO.

Præcipit Parabola, rebuspublicis ante omnia cavendum esse de iniquo et infami judicio, in causa aliqua celebri et gravi; præsertim ubi non absolvitur noxius, sed condemnatur insons. Etenim injuriæ inter privatos grassantes turbant quidem et polluunt latices justitiæ, sed tanquam in rivulis; verum judicia iniqua, qualia diximus, a quibus exempla petuntur, fontes ipsos justitiæ inficiunt et inquinant. Postquam enim tribunal cesserit in partes injustitiæ, status rerum vertitur tanquam in latrocinium publicum; fitque plane, ut *homo homini sit lupus.*[2]

PARABOLA.

26. *Noli esse amicus homini iracundo, nec ambulato cum homine furioso.*[3]

EXPLICATIO.

Quanto religiosius amicitiæ jura inter bonos servanda et colenda sunt, tanto magis cavendum est jam usque a principio de prudente amicorum delectu. Atque amicorum natura et mores, quantum ad nos ipsos spectant, omnino ferendi sunt; cum vero necessitatem nobis imponunt, qualem erga alios personam induamus et geramus, dura admodum et iniqua amicitiæ conditio est. Itaque interest inprimis, ut præcipit Salomon, ad vitæ pacem et præsidia, ne res nostras cum hominibus iracundis, et qui facile lites et jurgia provocant aut suscipiunt, commisceamus. Istud enim genus amicorum perpetuo nos contentionibus et factionibus implicabit; ut aut amicitiam abrumpere, aut incolumitati propriæ deesse cogamur.

[1] Prov. xxv. 26. [2] See Erasm. Adag. i. 1. 70. [3] Prov. xxii. 24.

PARABOLA.

27. *Qui celat delictum, quærit amicitiam; sed qui altero sermone repetit, separat fœderatos.*[1]

EXPLICATIO.

Duplex concordiam tractandi et animos reconciliandi via; altera, quæ incipit ab amnestia; altera quæ a repetitione injuriarum, subjungendo apologias et excusationes. Equidem memini sententiam viri admodum prudentis et politici; *Qui pacem tractat, non repetitis conditionibus dissidii, is magis animos dulcedine concordiæ fallit quam æquitate componit.* Verum Salomon, illo scilicet prudentior, in contraria opinione est; et amnestiam probat, repetitionem prohibet. Etenim in repetitione hæc insunt mala; tum quod ea sit veluti *unguis in ulcere;* tum quod periculum impendeat a nova altercatione (siquidem de injuriarum rationibus inter partes nunquam conveniet); tum denique quod deducat rem ad apologias; at utraque pars malit videri potius offensam remisisse, quam admisisse excusationem.

PARABOLA.

28. *In omni opere bono erit abundantia; ubi autem verba sunt plurima, ibi frequenter egestas.*[2]

EXPLICATIO.

Separat Salomon hac Parabola fructum laboris linguæ et laboris manuum; quasi ex altero proveniat egestas, ex altero abundantia. Etenim fit fere perpetuo ut qui multa effutiant, jactent multa, multa promittant, egeni sint, nec emolumentum capiant ex illis rebus de quibus loquuntur. Quinetiam, ut plurimum, industrii minime sunt aut impigri ad opera, sed tantummodo sermonibus se, tanquam vento, pascunt et satiant. Sane, ut poëta loquitur, *Qui silet est firmus.*[3] Is qui conscius est se in opere proficere, sibi plaudit et tacet; qui vero e contra conscius est auras se inanes captare, multa et mira apud alios prædicat.

PARABOLA.

29. *Melior est correptio manifesta, quam amor occultus.*[4]

EXPLICATIO.

Reprehendit Parabola mollitiem amicorum, qui amicitiæ privilegio non utuntur in admonendo libere et audacter amicos,

[1] Prov. xvii. 9.
[2] Prov. xiv. 23.
[3] Ovid, Remed. Amor. 697.
[4] Prov. xxvii. 5.

tam de erroribus quam de periculis suis. *Quid enim faciam* (solet hujusmodi mollis amicus dicere), *aut quo me vertam? Amo illum quantum quis maxime, meque si quid illi adversi contigerit ipsius loco libenter substituerim; sed novi ingenium ejus; si libere cum eo egero, animum illius offendam, saltem contristabo; neque tamen proficiam; atque citius eum ab amicitia mea alienabo, quam ab iis quæ in animo fixa habet abducam.* Hujusmodi amicum, tanquam enervem et inutilem, redarguit Salomon, atque plus utilitatis ab inimico manifesto quam ab ejus generis amico sumi posse pronunciat. Siquidem ea fortasse audire ei contigerit ab inimico per contumeliam, quæ amicus mussat præ nimia indulgentia.

PARABOLA.

30. *Prudens advertit ad gressus suos; stultus divertit ad dolos.*[1]

EXPLICATIO.

Duæ sunt prudentiæ species; altera vera et sana, altera degener et falsa, quam Salomon *stultitiæ* nomine appellare non dubitat. Qui priori se dederit, viis et vestigiis propriis cavet; periculis prospiciens, meditans remedia, proborum opera utens, contra improbos seipsum muniens; cautus incœptu, receptu non imparatus; in occasiones attentus, contra impedimenta strenuus; cum innumeris aliis, quæ ad sui ipsius actiones et gressus regendos spectant. At altera species tota est consuta ex fallaciis et astutiis, spemque ponit omnino in aliis circumveniendis iisdemque ad libitum effingendis. Hanc merito rejicit Parabola, non tantum ut improbam, sed etiam ut stultam. Primo enim, minime est ex iis rebus quæ in nostra sunt potestate, nec etiam aliqua constanti regula nititur; sed nova quotidie comminiscenda sunt stratagemata, prioribus fatiscentibus et obsoletis. Secundo, qui vafri et subdoli hominis famam et opinionem semel incurrerit, præcipuo se ad res gerendas instrumento prorsus privavit; hoc est, fide: itaque omnia parum votis suis consentientia experietur. Postremo, artes istæ, utcunque pulchræ videantur et complaceant, attamen sæpius frustrantur: quod bene notavit Tacitus; *Consilia callida et audacia expectatione læta, tractatu dura, eventu tristia.*[2]

[1] Prov. xiv. 8. and 15? M. Bouillet refers to Prov. xv. 21.

[2] Consilia callida et audacia primâ specie læta, tractatu dura, eventu tristia esse." These words, however, do not occur in Tacitus, but in the thirty-fifth book of Livy, c. 32. Bacon's recollection was probably misled by the epigrammatic character of the expression.

PARABOLA.

31. *Noli esse justus nimium, nec sapientior quam oportet; cur abripiare subito?* [1]

EXPLICATIO.

Sunt tempora (ut inquit Tacitus) *in quibus magnis virtutibus certissimum est exitium.*[2] Atque hoc viris virtute et justitia egregiis aliquando subito, aliquando diu ante prævisum, contingit. Quod si adjungatur etiam prudentia, hoc est, ut cauti sint et ad propriam incolumitatem evigilent, tum hoc lucrantur ut ruina eorum subito obveniat, ex occultis omnino et obscuris consiliis; quibus et evitetur invidia, et pernicies ipsos imparatos adioratur. Quod vero ad illud *nimium* quod in Parabola ponitur (quandoquidem non Periandri alicujus, sed Salomonis verba sunt ista, qui mala in hominum vita sæpius notat, nunquam præcipit) intelligendum est non de virtute ipsa (in qua *nimium* non est) sed de vana ejus atque invidiosa affectatione et ostentatione. Simile quiddam innuit Tacitus de Lepido; miraculi loco ponens, quod nunquam servilis alicujus sententiæ author fuisset, et tamen tam sævis temporibus incolumis mansisset; *Subit* (inquit) *cogitatio, utrum hæc fato regantur, an etiam sit in nostra potestate cursum quendam tenere inter deforme obsequium et abruptam contumaciam medium, periculo simul et indignitate vacuum?* [3]

PARABOLA.

32. *Da sapienti occasionem, et addetur ei sapientia.*[4]

EXPLICATIO.

Distinguit Parabola inter sapientiam illam quæ in verum habitum increverit et maturuerit, et illam quæ natat tantum in cerebro et conceptu, aut sermone jactatur, sed radices altas non egerit. Siquidem prior, oblata occasione in qua exerceatur, illico excitatur, accingitur, dilatatur, adeo ut seipsa major videatur; posterior vero, quæ ante occasionem alacris erat, occasione data fit attonita et confusa; ut etiam ipsi qui ea se præditum arbitrabatur in dubium vocetur, annon præceptiones de ea fuerint insomnia mera et speculationes inanes?

[1] Eccles. vii. 16.

[2] "Ob virtutes certissimum exitium."— *Tac. Hist.* i. 2.

[3] "Unde dubitare cogor, fato et sorte nascendi, ut cætera, ita principum inclinatio in hos, offensio in illos: an sit aliquid in nostris consiliis, liceatque inter abruptam contumaciam et deforme obsequium pergere iter ambitione et periculis vacuum."— *Tac. Ann.* iv. 20.

[4] Prov. ix. 9. [5] Prov. xxvii. 14.

PARABOLA.

33. *Qui laudat amicum voce alta, surgendo mane, erit illi loco maledictionis.*[1]

EXPLICATIO.

Laudes moderatæ, et tempestivæ, et per occasionem prolatæ, famæ hominum atque fortunæ plurimum conferunt; at immoderatæ, et streperæ, et importune effusæ, nihil prosunt: imo potius, ex sententia Parabolæ, impense nocent. Primo enim manifesto se produnt, aut ex nimia benevolentia oriundas, aut ex composito affectatas; quo collaudatum potius falsis præconiis demereantur quam veris attributis ornent. Secundo, laudes parcæ et modestæ invitant fere præsentes, ut ipsis etiam aliquid adjiciant; profusæ contra et immodicæ, ut aliquid demant et detrahant. Tertio (quod caput rei est) conflatur illi invidia, qui nimium laudatur; cum laudes omnes nimiæ videantur spectare ad contumeliam aliorum qui non minus merentur.

PARABOLA.

34. *Quomodo in aquis resplendent facies, sic corda hominum manifesta sunt prudentibus.*[2]

EXPLICATIO.

Distinguit Parabola inter mentes prudentium et cæterorum hominum; illas aquis aut speculis comparans, quæ species et imagines rerum recipiunt; cum alteræ similes sint terræ, aut lapidi impolito, in quibus nihil reflectitur. Atque eo magis apte comparatur animus hominis prudentis ad speculum, quia in speculo imago propria spectari possit una cum imaginibus aliorum; id quod oculis ipsis sine speculo non conceditur. Quod si animus prudentis adeo capax sit, ut innumera ingenia et mores observare et internoscere possit, superest ut detur opera quo reddatur non minus varius applicatione quam repræsentatione;

Qui sapit, innumeris moribus aptus erit.[3]

Atque his Salomonis Parabolis diutius fortasse immorati sumus, quam pro modo exempli; dignitate et rei ipsius et authoris longius provecti.

Neque tantum in usu erat apud Hebræos, sed alibi etiam priscorum sapientibus frequentissimum; ut si cujuspiam observatio in aliquid incidisset quod vitæ communi conducibile

[1] Prov. xxvii. 14. [2] Prov. xxvii. 19. [3] Ovid, De Arte Amand. i. 760.

fuisset, id redigeret et contraheret in brevem aliquam Sententiam, vel Parabolam, vel etiam Fabulam. Verum, quod ad Fabulas (sicut alias dictum est), illæ exemplorum vicarii et supplementa olim extiterunt: nunc, quando tempora historiarum copia abundent, ad animatum scopum rectius et alacrius collimatur. At modus scribendi qui optime convenit argumento tam vario et multiplici (quale est tractatus de Negotiis et Occasionibus Sparsis) aptissimus ille esset, quem delegit Macciavellus ad tractandas res politicas[1]; nimirum per observationes, sive *Discursus* (ut loquuntur), super Historiam et Exempla. Nam scientia quæ recenter et quasi in conspectu nostro ex particularibus elicitur, viam optime novit particularia denuo repetendi; atque certe ad practicam longe conducit magis, cum discursus sive disceptatio sub exemplo militat, quam cum exemplum disceptationi subjungitur. Neque enim hic ordo tantum spectatur, sed res ipsa. Cum enim exemplum statuitur tanquam disceptationis basis, universo cum circumstantiarum apparatu proponi solet; quæ discursum interdum corrigant, interdum suppleant; unde fit loco exemplaris ad imitationem et practicam. Ubi e contra, exempla in gratiam disceptationis adducta succincte et nude citantur, et tanquam mancipia nutus tantum disceptationis observant.

Hoc vero discriminis operæ pretium fuerit observasse; quod sicut Historiæ Temporum optimam præbent materiam ad Discursus super Politica, quales sunt illi Macciavelli, ita Historiæ Vitarum optime adhibentur ad Documenta de Negotiis; quoniam omnem occasionum et negotiorum, tam grandium quam leviorum, varietatem complectuntur. Imo, reperire est basin ad Præceptiones de Negotiis, utraque illa Historia adhuc commodiorem. Ea est, ut discursus fiant super Epistolas, sed prudentiores et magis serias; quales sunt illæ Ciceronis ad Atticum, et aliæ. Siquidem Epistolæ magis in proximo et ad vivum negotia solent repræsentare, quam vel Annales vel Vitæ. Quare jam et de materia et de forma portionis primæ Doctrinæ de Negotiis, quæ tractat Occasiones Sparsas, diximus; eamque inter Desiderata numeramus.

Est et alia portio ejusdem Doctrinæ, quæ tantum differt ab illa altera de qua diximus, quantum *sapere* et *sibi sapere*. Altera enim movere videtur tanquam a centro ad circumferen-

[1] Vide sup., p. 513.

tiam; altera, tanquam a circumferentia ad centrum. Est enim prudentia quædam consilii aliis impertiendi; est vero et alia suis rebus prospiciendi; atque hæ nonnunquam conjunguntur, sæpius separantur. Multi siquidem in suis ipsorum rationibus instituendis prudentissimi sunt, qui tamen in rebuspublicis administrandis aut etiam consiliis dandis nihil valent; formicæ similes, quæ creatura sapiens est ad sese tuendum, sed horto plane noxia. Hæc virtus *sibi sapiendi* Romanis ipsis, licet patriæ optimis curatoribus, non ignota fuit: unde Comicus, *Nam pol sapiens fingit fortunam sibi.*[1] Quin et in adagium apud ipsos versum est, *Faber quisque fortunæ propriæ*[2]: et Livius hanc ipsam Catoni Majori tribuit; *In hoc viro tanta vis animi et ingenii inerat, ut quocunque loco natus esset sibi ipse fortunam facturus videretur.*[3]

Hoc genus Prudentiæ, si quis ipsum profiteatur et palam venditet, semper habitum est non modo non politicum, verum etiam infaustum quiddam et inauspicatum: sicut in Timotheo Atheniensi observatum est; qui, postquam præclara multa facinora in decus et commodum civitatis suæ edidisset, atque administrationis suæ (sicut tum moris erat) populo rationem redderet, singula conclusit hac clausula; *Atque in hac re Fortunæ partes fuerunt nullæ.*[4] Contigit vero, ut post id temporis nunquam ei quicquam fœliciter cesserit. Sane nimis elatum hoc et altum sapiens, eodem spectans quo Ezechielis illud de Pharaone; *Dicis, Fluvius est meus, et ego feci memetipsum*[5]; aut illud Habacuc prophetæ; *Exultant et sacrificant reti suo*[6]: aut illud etiam poëtæ, de contemptore Deum Mezentio;

> Dextra mihi Deus, et telum quod missile libro,
> Nunc adsint."[7] ———

Denique Julius Cæsar nunquam (quod memini) impotentiam cogitationum suarum arcanarum prodidit, nisi simili dicto. Cum enim aruspex ei referret exta reperta fuisse non bona, admurmuravit submisse; *Erunt lætiora cum volo*[8]: quod etiam dictum mortis suæ infortunium non diu præcessit. Verum excessus iste fiduciæ (ut diximus) res, ut profana, ita semper infœlix. Quapropter viris magnis et vere sapientibus visum,

[1] "Nam sapiens quidem pol ipse fingit fortunam sibi."
PLAUT. *Trinummus*, ii. 2. 84.

[2] Appius Claudius is said to have been the author of this commonly quoted sentence.

[3] Livy, xxxix. 40. [4] Plut. in Syllâ, c. 6. [5] Ezek. xxix. 3.
[6] Habak. i. 16. [7] Virg. Æn. x. 773. [8] Sueton. in Julio, c. 77.

successus quoslibet fœlicitati suæ, non virtuti aut industriæ, tribuere: nam et Sylla *Fœlicem* se, non *Magnum* cognominavit[1]; et Cæsar (melius quam supra) ad navis gubernatorem: *Cæsarem vehis, et Fortunam ejus.*[2]

Attamen istæ sententiæ; *Faber quisque fortunæ suæ; Sapiens dominabitur astris*[3]; *Invia virtuti nulla est via*[4]; ac similes; si intelligantur et adhibeantur potius pro calcaribus ad industriam quam pro stapedibus ad insolentiam, magisque ut progignant in hominibus decretorum constantiam et robur quam arrogantiam et jactantiam, tanquam sanæ et salutares merito habitæ sunt, ac proculdubio in pectoribus hominum magnanimorum sedem nonnullam occuparunt; eousque, ut cogitationes tales quandoque ægre dissimulent. Videmus enim Augustum Cæsarem (qui, cum avunculo suo comparatus, potius ab illo diversus quam inferior fuit, sed vir certe paulo moderatior) sub finem vitæ petiisse ab amicis qui lectum ejus circumstabant, ut postquam expirasset sibi *plauderent;* quasi conscius sibi fuisset, *Mimum vitæ a se commode transactum.*[5] Hæc quoque doctrinæ portio inter Desiderata numeranda est; non quin in praxi, etiam nimio plus quam oportet, usurpata sit et frequentata; verum quod libri de illa silent. Quamobrem ex more nostro, sicut in priore, nonnulla ejus capita recensebimus; eamque *Fabrum Fortunæ*, sive (ut diximus) *Doctrinam de Ambitu Vitæ*, nominabimus.

Ac primo quidem intuitu novum quoddam et insolitum argumentum tractare videbor, docendo homines quomodo Fortunæ suæ Fabri fieri possint: doctrinam certe, cui quivis libenter se discipulum addixerit, donec difficultatem ejusdem habuerit perspectam. Non enim leviora sunt aut pauciora aut minus ardua quæ ad Fortunam comparandam requiruntur, quam quæ ad Virtutem; resque est æque difficilis ac severa, fieri vere Politicum ac vere Moralem. At hujus Doctrinæ pertractatio plurimum ad literarum tum decus tum pondus pertinet. Interest enim inprimis honoris literarum, ut homines isti pragmatici sciant eruditionem haudquaquam aviculæ qualis est alauda

[1] Vide Plut. in Syllâ, c. 6.
[2] Plut. De Roman. Fortun. p. 319.
[3] This sentence is ascribed to Ptolemy by Cognatus.
[4] Ovid, Met. xiv. 113.
[5] "Amicos admissos percunctatus Ecquid videretur mimum vitæ commode transegisse, adjecit et clausulam:

Δότε κρότον, καὶ πάντες ὑμεῖς μετὰ χαρᾶς κτυπήσατε."

—*Sueton. in Aug.* c. 99

similem esse, quæ in sublime ferri et cantillando se oblectare soleat, at nihil aliud; quinimo ex accipitris potius genere esse, qui et in alto volare, ac subinde, cum visum fuerit, descendere et prædam rapere novit. Deinde et ad perfectionem literarum hoc ipsum spectat, quia legitimæ inquisitionis vera norma est, *ut nihil inveniatur in globo materiæ, quod non habeat parallelum in globo crystallino sive intellectu.* Hoc est, ut nihil veniat in Practicam, cujus non sit etiam Doctrina aliqua et Theoria. Neque tamen literæ hanc ipsam Fortunæ Architecturam aliter admirantur aut æstimant, quam ut opus quoddam inferioris generis. Nemini enim Fortuna Propria, pro dono *Esse*[1] *sui* a Deo concesso, ullo modo digna retributio esse possit. Quin et non raro fit, ut viri virtutibus egregii fortunæ suæ sponte renuncient, ut rebus sublimioribus vacent. Digna tamen est Fortuna, quatenus virtutis ac bene merendi organum est, sua quoque speculatione et doctrina.

Ad hanc Doctrinam pertinent præcepta, nonnulla Summaria, nonnulla Sparsa et Varia. Præcepta Summaria versantur circa veram Notitiam et Aliorum et Sui. Primum igitur præceptum (in quo cardo Notitiæ Aliorum vertitur) illud constituatur, ut procuremus nobis quantum fieri possit *fenestram* illam, quam olim requisivit Momus.[2] Ille, cum in humani cordis fabrica tot angulos et recessus conspicatus esset, id reprehendit quod defuisset fenestra, per quam in obscuros illos et tortuosos anfractus inspicere quis possit. Hanc autem fenestram obtinebimus, si omni sedulitate nobis informationem comparemus et procuremus de personis, quibuscum intercedunt negotia, particularibus; earumque ingeniis, cupiditatibus, finibus, moribus, auxiliis et adminiculis quibus præcipue suffulciuntur et valent; et rursus defectibus et imbecillitatibus, quaque ex parte maxime pateant et obnoxii sint; amicis, factionibus, patronis, clientelis; rursusque inimicis, invidis, competitoribus; etiam temporibus et aditibus

(Sola viri molles aditus et tempora noris);[3]

denique institutis et normis quas sibi præscripserunt, et simili-

[1] "Esse" is here used as an indeclinable substantive, a construction common among the schoolmen. "Posse" and "Velle" are often used in the same way.

[2] See Lucian. in Hermotim. 20. But as Bacon, in the Essay on Building, alludes to a part of the story which Lucian does not tell, it is probable that his knowledge of it was derived from some other source. The most obvious one is the Æsopic fable; but there Momus's wish is not quite the same as in the text. In the fable he complains not that there are no shutters, θυρίδες, in the breast, but that αἱ φρένες are inside it, and not on the surface.

[3] Virg. Æn. iv. 423.

bus. Quinetiam non solum informatio capienda est de Personis, sed insuper de Actionibus particularibus quæ de tempore in tempus in motu sunt et tanquam sub incude; quomodo regantur et succedant, quorum studiis foveantur, a quibus oppugnentur, cujusque sint ponderis et momenti, et quid secum trahant, et hujusmodi. Etenim Actiones præsentes nosse, et in se plurimum prodest, et illud insuper habet quod absque hoc etiam personarum notitia valde futura sit fallax et erronea. Mutantur enim homines simul cum actionibus; et alii sunt, dum actionibus ipsis implicentur et obsideantur, alii postquam redierint ad ingenium. Atque hæ de rebus particularibus informationes, quæ tam ad Personas quam ad Actiones spectant, sunt tanquam propositiones minores in omni activo syllogismo. Nulla enim observationum aut axiomatum (unde conficiuntur majores propositiones politicæ) veritas aut excellentia ad conclusionis firmamentum sufficere possit, si in minore propositione fuerit erratum. Quod vero hujusmodi notitia comparari possit, fidejussor nobis est Salomon, qui ait; *Consilium in corde viri, tanquam aqua profunda; sed vir prudens exhauriet illud.*[1] Quamvis autem ipsa notitia non cadat sub præceptum, quoniam individuorum est, attamen mandata de eadem elicienda utiliter dari possunt.

Notitia hominum sex modis elici et hauriri potest; per Vultus et Ora ipsorum; per Verba; per Facta; per Ingenia sua; per Fines suos; denique per Relationes Aliorum. Quantum ad Vultus attinet, minime nos moveat vetus adagium, *Fronti nulla fides.*[2] Licet enim hoc ipsum non perperam dictum sit de Vultus et Gestus compositione externa et generali, attamen subsunt subtiliores quidam motus et labores Oculorum, Oris, Vultus, et Gestus; ex quibus reseratur et patet (ut eleganter ait Q. Cicero) veluti *janua quædam animi.*[3] Quis Tiberio Cæsare occultior? At Tacitus, notans characterem et modum loquendi diversum quo usus est Tiberius in laudando apud senatum res a Germanico et a Druso gestas, de laudibus Germanici sic; *Magis in speciem adornatis verbis, quam ut penitus sentire videretur*[4]; de laudibus Drusi sic; *Paucioribus, sed intentior, et fida oratione.*[5] Iterum Tacitus, eundem Tiberium alias

[1] Prov. xx. 5. [2] Juven. ii. 8. [3] De Pet. Cons. § 11.

[4] In the *Advancement of Learning*, this passage stands thus: — "None more close than Tiberius, and yet Tacitus saith of Gallus, *Etenim vultu offensionem conjectaverat.* So again, noting," &c. The passage referred to is in *Annals*, i. 12., and was probably omitted by an oversight, for it is quite in point. — *J. S.*

[5] Tac. Ann. i. 52. ["Rettulit tamen ad senatum de rebus gestis, multaque d

etiam ut nonnihil pellucidum notans; *In aliis* (inquit) *erat veluti eluctantium verborum; solutius vero loquebatur, quando subveniret.*[1] Sane difficile reperiatur simulationis artifex aliquis tam peritus et egregius, aut vultus aliquis ita coactus, et, ut ille loquitur, *jussus*, qui a sermone artificioso et simulatorio possit istas notas sejungere, quin aut sermo sit solito solutior, aut comptior, aut magis vagus et oberrans, aut magis aridus et quasi eluctans.

Ad Verba Hominum quod attinet; sunt quidem illa (ut de urinis loquuntur medici) *meretricia.* Sed isti meretricii fuci optime deprehenduntur duobus modis; cum scilicet proferuntur verba aut ex improviso, aut in perturbatione. Sic Tiberius, cum ex Agrippinæ verbis aculeatis subito commotus esset et nonnihil abreptus, extra innatæ simulationis terminos pedem protulit; *Audita hæc* (inquit Tacitus) *raram occulti pectoris vocem elicuere; correptamque Græco versu admonuit, ideo lædi quia non regnaret.*[2] Quare poëta perturbationes hujusmodi non inscite appellat *Torturas*, quod ab iis secreta sua prodere homines compellantur:

——— Vino tortus et ira.[3]

Ipsa sane testatur experientia paucos admodum reperiri, qui erga arcana sua tam fidi sint, animumque gerant adeo obfirmatum, quin interdum ex iracundia; interdum ex jactantia; interdum ex intima erga amicum benevolentia; interdum ex animi imbecillitate, qui se mole cogitationum onerari amplius non sustineat; interdum denique ex alio quopiam affectu; intimas animi cogitationes revelent et communicent. Ac ante omnia sinus animi excutit, si simulatio simulationem impulerit; juxta adagium illud Hispanorum; *Dic mendacium, et erues veritatem.*[4]

Quin et Factis ipsis, licet humani animi pignora sint certissima, non prorsus tamen fidendum; nisi diligenter atque attente pensitatis prius illorum et magnitudine et proprietate. Illud enim verissimum; *Fraus sibi in parvis fidem præstruit, ut ma-*

virtute ejus memoravit, magis in speciem verbis adornata quam ut penitus sentire crederetur. Paucioribus Drusum et finem Illyrici motus laudavit, sed intentior et fidâ oratione."]

[1] . . . Compositus alias et velut eluctantium verborum, solutius promptiusque loquebatur quotiens subveniret."— *Tac. Ann.* iv. 31.

[2] Tac. Ann. iv. 52. In modern editions of Tacitus the last clause stands thus: — "Non ideo lædi quia non regnaret."

[3] Hor. Ep. i. 18. 38.

[4] In the *Advancement of Learning* this proverb is given in Spanish: "Di mentira y sacaras verdad."

jore emolumento fallat.[1] Italus vero seipsum *in ipso stare lapide* putat *ubi præco prædicat*, si melius solito tractetur absque causa manifesta.[2] Etenim officia ista minora homines reddunt oscitantes et quasi consopitos, tam ad cautionem quam ad industriam, atque recte a Demosthene appellantur *alimenta socordiæ.*[3] Porro proprietatem et naturam nullorum Factorum, etiam quæ beneficiorum loco habentur, subdolam et ambiguam, luculenter cernere licet ex eo quod Antonio Primo imposuit Mutianus; qui post reditum cum eo in gratiam, sed fide pessima, plurimos ex Antonii amicis ad dignitates evexit; *Simul amicis ejus præfecturas et tribunatus largitur.*[4] Hoc autem astu, Antonium non munivit, sed exarmavit penitus et desolavit, amicitias ejus ad se transferendo.

Certissima autem clavis ad animos hominum reserandos vertitur in rimandis et pernoscendis vel Ingeniis et Naturis ipsorum, vel Finibus et Intentionibus. Atque imbecilliores certe et simpliciores ex Ingeniis, prudentiores autem et tectiores ex Finibus suis optime judicantur. Certe prudenter et facete (licet meo judicio minus vere) dictum fuit a nuntio quopiam Pontificis, sub reditu ejus a legatione apud nationem quandam ubi tanquam Ordinarius resederat. Interrogatus de delectu successoris sui, consilium dedit; *Ut nullo modo mitteretur aliquis qui eximie prudens esset, sed potius mediocriter tantum; quoniam* (inquit) *ex prudentioribus nemo facile conjiciet, quid verisimile foret illius gentis homines facturos.* Sane non raro intervenit ille error, et maxime familiaris est viris prudentibus, ut ex modulo ingenii proprii alios metiantur; ac proinde ultra scopum sæpius jaculentur, supponendo quod homines majora quædam meditentur et sibi destinent, et subtilioribus technis utantur, quam quæ illorum animos unquam subierint. Quod etiam eleganter innuit adagium Italicum, quo notatur *nummorum, prudentiæ, fidei, semper minores inveniri rationes quam quis putaret.*[5] Quare in levioris ingenii hominibus, quia multa absurda faciunt, capienda est conjectura potius ex propensionibus Ingeniorum

[1] "Fraus fidem in parvis sibi præstruit, ut, quum operæ pretium sit, cum magnâ mercede fallat." — *Livy*, xxviii. 42.

[2] Bacon alludes to the Italian proverb: —

"Chi mi fa più caresse chè non suole
O m' a ingannato, o ingannar mi vuole."

[3] See the note at p. 681.

[4] Tac. Hist. iv. 39.

[5] Di danari, di senno, e di fede
C' è ne manco che non credi.

See the *Advancement of Learning*.

quam ex destinationibus Finium. Porro, Principes quoque (sed longe aliam ob causam) ab Ingeniis optime judicantur; Privati autem ex Finibus. Principes enim fastigium adepti humanorum desideriorum, nullos fere sibi propositos Fines habent ad quos, præsertim vehementer et constanter, aspirant; ex quorum Finium situ et distantia reliquarum suarum actionum possit excipi et confici directio et scala; id quod inter alia causa est vel præcipua, ut *corda eorum* (quod Scriptura pronunciat) *sint inscrutabilia.*[1] At Privatorum nullus est, qui non sit plane veluti viator, et proficiscatur intente ad aliquam itineris metam, ubi consistat; unde non male divinare quis poterit quid facturus sit, aut non facturus. Si enim in ordine sit quidpiam ad finem suum, probabile est facturum; sin sit in contrarium finis, minime. Neque de Finium aut Ingeniorum in hominibus diversitate informatio capienda est simpliciter tantum, sed et comparate; quid scilicet prædominetur, et reliqua in ordinem cogat. Sic, ut videmus, Tigellinus, cum se Petronio Turpiliano inferiorem sentiret in voluptatibus Neroni ministrandis et prægustandis, *metus* (ut ait Tacitus) *Neronis rimatus est*[2]; et hoc pacto æmulum evertit.

Ad notitiam quod attinet de hominum animis secundariam, nimirum quæ ab Aliorum Relatione desumitur, breviter dicere sufficiet. Defectus et vitia didiceris optime ab inimicis; virtutes et facultates ab amicis; mores et tempora a famulis; opiniones et meditationes ab intimis familiaribus, cum quibus frequentius colloquia miscent. Fama popularis levis est; et superiorum judicia minus certa; etenim coram illis tectiores incedunt homines. *Verior fama e domesticis emanat.*[3]

Verum ad inquisitionem istam universam via maxime compendiaria in tribus consistit. Primum, ut amicitias multas comparemus cum ejusmodi hominibus qui multiplicem et variam habent tam rerum quam personarum notitiam; inprimis vero enitendum ut saltem singulos habeamus præsto, qui pro negotiorum atque hominum diversitate, nos de unaquaque re certiores facere et solide informare possint. Secundo, ut prudens temperamentum et mediocritatem quandam persequamur et in libertate sermonis et in taciturnitate; frequentius libertatem usurpantes; at cum res postulat, silentium. Libertas siquidem

[1] Prov. xxv. 3. [2] Tac. Ann. xiv. 57.

[3] "Fere omnis sermo ad forensem famam a domesticis emanat auctoribus."— *Q. Cicero, De Pet. Consul.* § 5.

in sermone etiam alios invitat et provocat ut pari libertate erga nos utantur, et sic multa deducit ad notitiam nostram; at taciturnitas fidem conciliat, efficitque ut ament homines secreta sua apud nos tanquam in sinu deponere. Tertio, is nobis paulatim acquirendus est habitus, ut vigilante et præsente animo, in omnibus colloquiis et actionibus, simul et rem quæ instat geramus et alia quæ incidunt observemus. Nam sicut Epictetus præcipit, ut Philosophus in singulis suis actionibus ita secum loquatur; *Et hoc volo, et etiam institutum servare*[1]; sic Politicus in singulis negotiis ita secum statuat; *Et hoc volo, atque etiam aliquid quod in futurum usui esse possit addiscere.* Itaque, qui eo sunt ingenio, ut nimium *hoc agant,* et toti sint in præsente negotio quod in manibus habent, de iis autem quæ interveniunt nec cogitant quidem (id quod in se agnoscit Montaneus[2]), illi certe ministri regum aut rerumpublicarum sunt vel optimi, sed ad proprias fortunas claudicant. Interim cautio ante omnia adhibenda, ut impetum animi et alacritatem nimiam cohibeamus; ne multa sciendo ad nos multis immiscendum feramur. Infœlix enim quiddam est et temerarium *Polypragmosyne.* Itaque ista quam comparandam præcipimus Notitiæ Rerum et Personarum varietas huc tandem redit, ut et Rerum quas suscipimus, et Hominum quorum opera utimur, magis cum judicio delectum faciamus; unde cuncta et magis dextre et magis tuto disponere et administrare sciamus.

Notitiam Aliorum sequitur Notitia Sui. Etenim non minor diligentia adhibenda est, sed major potius, ut nos de nobis ipsis quam de aliis vere et accurate informemus. Quippe cum oraculum illud, *Nosce teipsum,* non tantum sit canon prudentiæ universalis, sed et in Politicis præcipuum locum habeat. Optime enim homines monet S. Jacobus; *Eum qui vultum in speculo consideravit, oblivisci tamen illico qualis fuerit*[3]; ut omnino frequenti inspectione sit opus. Idque tenet etiam in politicis. Sed specula scilicet sunt diversa. Nam speculum divinum, in quo nos contueri debemus, est Verbum Dei; speculum autem politicum non aliud est quam status rerum et temporum in quibus vivimus.

Examen igitur accuratum, nec quale esse solet sui nimium amantis, instituendum est homini de propriis Facultatibus,

[1] Epict. Enchir. c. 9.
[2] See Montaigne's Essay, *De l' Utilité et de l'Honnêtteté.*
[3] St. James, i. 23, 24.

Virtutibus, et Adminiculis: necnon de Defectibus, Inhabilitatibus, et Obstaculis: ita rationem subducendo, ut hæc perpetuo in majus, illa autem minoris potius quam revera sunt æstimentur. Ex hujusmodi autem examine in considerationem veniant quæ sequuntur.

Prima consideratio sit, quomodo alicui homini moribusque et naturæ suæ cum *temporibus* conveniat; quæ si inventa fuerint congrua, omnibus in rebus magis libere et solute agere, et suo ingenio uti liceat; sin sit aliqua antipathia, tum demum in universo vitæ cursu magis caute et tecte est incedendum, minusque in publico versandum. Sic Tiberius fecit, qui morum suorum sibi conscius cum sæculo suo non optime convenientium, ludos publicos nunquam spectavit; quinetiam per duodecim continuos annos postremos nunquam in senatum venit; ubi contra Augustus perpetuo in oculis hominum vixit, quod et Tacitus observat; *Alia Tiberio morum via.*[1] Eadem et Periclis ratio fuit.

Secunda sit consideratio, quomodo alicui conveniat cum *professionibus* et *generibus vitæ* quæ in usu et pretio sunt, quorumque sibi delectus sit faciendus; ut si jam decretum non sit de genere vitæ, maxime aptum et ingenio suo congruum sumat; sin jampridem id genus vitæ ad quod minus a natura factus est fuerit ingressus, sub prima occasione se subducat et novam conditionem arripiat. Id quod a Valentino Borgia[2] videmus factum, ad vitam sacerdotalem a patre innutrito, quam tamen postea ejuravit, suo obsecutus ingenio, et vitæ militari se applicuit; quanquam principatu æque ac sacerdotio indignus, cum utrunque homo pestilens dehonestaverit.

Tertia sit consideratio, quomodo se habeat quis comparatus ad *æquales* et *et æmulos suos*, quos verisimile sit eum habiturum in fortuna sua competitores; eumque vitæ cursum teneat, in quo maxima inveniatur virorum egregiorum solitudo, atque in quo probabile sit seipsum inter cæteros maxime posse enitere. Id quod a C. Cæsare factum est; qui ab initio orator fuit, et causas egit, et in toga potissimum versabatur; cum vero vidisset Ciceronem, Hortensium, Catulum, eloquentiæ gloria excellere, rebus vero bellicis clarum admodum neminem, præter

[1] Tac. Annal. i. 54.

[2] Better known as Cæsar Borgia, son of Alexander the Sixth. After his change of profession, for an account of which see Guicciardini, vi. 3., he was made Duke of the Valentinois, and is therefore spoken of by Italian writers as "il duca Valentino." Bacon has here used this title as a prænomen.

Pompeium, destitit ab incœpto, et potentiæ illi civili multum valedicere jubens transtulit se ad artes militares et imperatorias; ex quibus summum rerum fastigium conscendit.[1]

Quarta sit consideratio, ut naturæ suæ et ingenii rationem habeat quis in *deligendis amicis ac necessariis.* Siquidem diversis versum genus amicorum convenit; aliis solenne et taciturnum; aliis audax et jactabundum; et complura id genus. Certe notatu dignum est, quales fuerint amici Julii Cæsaris (Antonius, Hirtius, Pansa, Oppius, Balbus, Dolabella, Pollio, reliqui). Illi scilicet jurare solebant, *Ita vivente Cæsare moriar*[2]; infinitum studium erga Cæsarem præ se ferentes; erga omnes alios arrogantes et contemptores; fueruntque homines in negotiis gerendis impigri, fama et existimatione mediocres.

Quinta sit consideratio, ut caveat quis sibi ab *exemplis,* neque ad imitationem aliorum se inepte componat; quasi quod aliis fuerit perviura, etiam sibi patere necesse sit; neutiquam secum reputans, quantum fortasse interfuerit inter suum et illorum quos ad exemplum sibi delegit ingenium et mores. In quem errorem manifesto incidit Pompeius, qui (ut Cicero scriptum reliquit) toties solitus erat dicere; *Sylla potuit, ego non potero?*[3] Qua in re vehementer sibi imposuit, cum ingenium et rationes agendi Syllæ a suis *toto cœlo* (ut aiunt) *distarent:* cum alter ferox esset, violentus, quique factum in omnibus urgeret; alter gravis, legum memor, omniaque ad majestatem et famam componens; unde longe minus erat ad perficienda quæ cogitarat efficax et validus. Sunt et aliæ hujus generis præceptiones: verum hæ ad exemplum reliquarum sufficient.

Neque vero *Nosse seipsum* homini sufficit; sed ineunda etiam est ratio secum quomodo se *ostentare, declarare,* denique *flectere* se et *effingere,* commode et prudenter possit. Ad ostentandum se quod attinet, nihil videmus usuvenire frequentius quam ut qui virtutis habitu sit inferior, specie virtutis externa sit potior. Non parva igitur est prudentiæ prærogativa, si quis arte quadam et decore specimen sui apud alios exhibere possit; virtutes suas, merita, atque fortunam etiam (quod sine arrogantia aut fastidio fieri possit) commode ostentando; contra vitia, defectus, infortunia et dedecora artificiose occultando: illis immorans easque

[1] See Plut. in Cæsar, c. 3.

[2] Bacon alludes to the phrase which occurs in Balbus's letter to Cicero: "Ita incolumi Cæsare moriar." See the *Ep. ad Att.* ix. 8.

[3] Cicero, Ep. ad Att. ix. 10.

veluti ad lumen obvertens, his subterfugia quærens aut apte ea interpretando eluens; et similia. Itaque de Mutiano, viro sui temporis prudentissimo et ad res gerendas impigerrimo, Tacitus; *Omnium, quæ dixerat feceratque, arte quadam ostentator.*[1] Indiget certe res hæc arte nonnulla, ne tædium et contemptum pariat: ita tamen ut Ostentatio quæpiam, licet usque ad vanitatis primum gradum, vitium sit potius in Ethicis quam in Politicis. Sicut enim dici solet de calumnia; *Audacter calumniare, semper aliquid hæret*[2]; sic dici possit de jactantia (nisi plane deformis fuerit et ridicula), *Audacter te vendita, semper aliquid hæret.* Hærebit certe apud populum, licet prudentiores subrideant. Itaque existimatio parta apud plurimos paucorum fastidium abunde compensabit. Quod si ista de qua loquimur *sui ostentatio* decenter et cum judicio regatur; exempli gratia, si nativum quendam pectoris candorem et ingenuitatem præ se ferat; aut si illis temporibus adhibeatur, vel cum pericula circumstent (ut apud viros militares in bellis), vel cum alii invidia flagrent; aut si verba quæ ad laudes proprias pertinent tanquam aliud agenti excidisse videantur, minimeque vel serio vel prolixe nimis iis insistatur; aut si ita quis se laudibus honestet, ut simul etiam censuris et jocis erga se non abstineat; aut si denique hoc facit non sponte, sed tanquam lacessitus et aliorum insolentiis et contumeliis provocatus; non parvum certe hæc res existimationi hominis cumulum adjicit. Neque sane exiguus est eorum numerus, qui cum natura sint magis solidi et minime ventosi, atque propterea hac arte honori suo velificandi careant, moderationis suæ nonnulla cum dignitatis jactura dant pœnas.

Verum hujusmodi *ostentationem* Virtutis utcunque aliquis infirmiore judicio et nimium fortasse ethicus improbaverit; illud nemo negarit, dandam saltem esse operam ut virtus per incuriam justo suo pretio non fraudetur, et minoris quam revera est æstimetur. Hæc vero, in virtute æstimanda, pretii diminutio tribus modis solet contingere. Primo, quando quis in rebus gerendis se et operam suam offert et obtrudit, non vocatus aut accersitus; hujusmodi enim officiis remunerationis loco esse solet, si non repudientur. Secundo, quando quis in principio rei gerendæ viribus suis nimium abutitur, et quod

[1] "Omnium quæ diceret atque ageret arte quâdam ostentator."—*Tac. Hist.* ii. 80.

[2] This precept seems taken from the advice given by Medius to Alexander's sycophants. He told them to calumniate boldly,—"that the wounds they inflicted might heal, but would always leave a scar."—*Plut. Quomodo quis discernere, &c.*, c. 24.

sensim erat præstandum uno impetu effundit; id quod rebus bene administratis præproperam conciliat gratiam, in fine autem satietatem inducit. Tertio, quando quis virtutis suæ fructum in laudibus, plausu, honore, gratia, sibi præbitis nimis cito et leviter sentit, atque in iis sibi complacet; de quo prudens habetur monitum; *Cave ne insuetus rebus majoribus videaris, si hæc te res parva sicuti magna delectat.*[1]

Defectuum enimvero sedula *occultatio* minoris haudquaquam momenti est, quam virtutum prudens et artificiosa ostentatio. Defectus autem occultantur et latent maxime triplici quadam industria, et quasi tribus latebris; Cautione, Prætextu, et Confidentia. Cautionem dicimus, quando iis rebus prudenter abstinemus, quibus pares non sumus; ubi contra ingenia audacula et inquieta se facile ingerunt sine judicio rebus quibus non insueverunt, et proinde defectus suos proprios publicant et quasi proclamant. Prætextum dicimus, cum sagaciter et prudenter viam nobis sternimus et munimus, qua benigna et commoda de vitiis et defectibus nostris fiat interpretatio, quasi aliunde provenientibus aut alio tendentibus quam vulgo existimatur. Etenim de latebris vitiorum non male poëta;

Sæpe latet vitium proximitate boni.[2]

Quare, si quem defectum in nobis ipsis perceperimus, opera danda ut personam et prætextum virtutis finitimæ mutuemur, sub cujus umbra lateat. Verbi gratia, tardo gravitas prætexenda, ignavo lenitas, et sic de cæteris. Illud etiam utile, probabilem aliquam causam obtendere et in vulgus spargere, qua adducti ultimas vires nostras promere refugiamus; ut quod non possimus, nolle videamur. Quod ad Confidentiam attinet, impudens certe est remedium, sed tamen certissimum atque efficacissimum; nempe, ut quis ea omnino contemnere et vilipendere se profiteatur, quæ revera assequi non possit: mercatorum prudentium more, quibus solenne est et proprium ut pretium mercium suarum attollant, aliorum deprimant. Est tamen et aliud Confidentiæ genus hoc ipso impudentius; nimirum, perfricta fronte defectus suos etiam opinioni obtrudere et venditare, quasi in iis quibus maxime destituitur se eminere credat; atque ut hoc facilius cæteris imponat, se in iis rebus quibus revera pluri-

[1] "Videte ne insueti rerum majorum videamini, si vos parva res sicuti magna delectat."—*Rhetor. ad Heren.* iv. 4.

[2] Vide suprà, p. 677.

mum pollet fingat diffidentem; quemadmodum fieri videmus in poëtis; poëta enim carmina sua recitante, si unum aliquem versiculum non admodum dixeris probandum, audias illico; *Atque hic versus pluris mihi constitit, quam reliquorum plurimi.* Tum vero alium quempiam versum adducet quasi sibi suspectum, et de eo quid putes sciscitabitur, quem satis norit inter plurimos esse optimum et censuræ minime obnoxium. Ante omnia vero ad hoc quod nunc agitur, ut scilicet specimen sui quis edat coram aliis illustre et jus suum in omnibus retineat, nil magis interesse judico quam ne quis per nimiam suam naturæ bonitatem et suavitatem se exarmet et injuriis et contumeliis exponat; quin potius in omnibus aliquos animi liberi et generosi, et non aculei minus quam mellis intra se gestantis, igniculos subinde emittat. Quæ quidem munita vitæ ratio, una cum prompto et parato ad se a contumeliis vindicandum animo, aliquibus ex accidente imponitur et necessitate quadam inevitabili, propter aliquid infixum in persona aut fortuna sua; veluti fit in deformibus et spuriis et ignominia aliqua mulctatis; unde hujusmodi homines, si virtus non desit, fœlices plerunque evadunt.

Quod vero ad se *declarandum* attinet; id alia res omnino est ab ostentatione sui, de qua diximus. Neque enim ad virtutes aut defectus hominum refertur, sed ad actiones vitæ particulares. Qua in parte nihil invenitur magis politicum, quam ut mediocritas quædam servetur prudens et sana, in sensa animi circa actiones particulares aperiendo aut recondendo. Licet enim profunda taciturnitas, et consiliorum occultatio, et is rerum gerendarum modus qui omnia cœcis et (ut modernæ linguæ potius loquuntur) surdis artibus et mediis operatur, res sit et utilis et mirabilis; tamen non raro evenit, ut (quod dicitur) *Dissimulatio errores pariat, qui dissimulatorem ipsum illaqueant.* Nam videmus viros politicos maxime omnium insignes, libere et indissimulanter fines quos peterent palam proferre non dubitasse. Sic L. Sylla manifesto præ se tulit, *Se omnes mortales vel fœlices vel infœlices fieri cupere, prout sibi essent vel amici vel inimici.* Sic Cæsar, cum primum profectus est in Gallias, nil veritus est profiteri, *Se malle primum esse in villa obscura quam secundum Romæ.*[1] Idem Cæsar, cœpto jam bello, dissimulatorem minime egit, si audiamus quid Cicero de illo prædicet. *Alter* (Cæsarem innuens) *non recusat, sed quodammodo postulat, ut* (*ut*

[1] See Plutarch's Apophthegms.

est) *sic appelletur Tyrannus.*[1] Similiter videmus, in epistola quadam Ciceronis ad Atticum, quam minime fuerit Augustus Cæsar dissimulator; qui in ipso ingressu ad res gerendas, cum adhuc senatui esset in deliciis, solitus tamen erat in concionibus apud populum jurare illa formula; *Ita parentis honores consequi liceat.*[2] Illud autem non minus quiddam erat quam ipsa tyrannis. Verum est, ad invidiam paululum leniendam, solitum eum simul ad statuam Julii Cæsaris, quæ in rostris posita erat, manum protendere. Homines autem ridebant, et plaudebant, et admirabantur, et inter se ita loquebantur; *Quid hoc est? Qualis adolescens!* Sed tamen nihil malitiæ in eo suspicabantur, qui tam candide et ingenue quod sentiret loqueretur. Et isti quidem, quos nominavimus, prospera omnia consecuti sunt; Pompeius contra, qui ad eosdem tendebat fines, sed viis magis umbrosis et obscuris (sicut Tacitus de eo loquitur, *Occultior non melior*[3]; atque Sallustius similiter idem insimulat, *Ore probo, animo inverecundo*[4]), id prorsus agebat et innumeris technis moliebatur, ut cupiditates suas et ambitionem alte recondendo interim rempublicam in anarchiam et confusionem redigeret, quo illa se necessario in sinus ejus conjiceret, atque hoc pacto summa rerum ad eum deferretur quasi invitum et renitentem. Cum vero hoc se putaret consecutum, factus consul solus (quod nunquam cuiquam contigisset), nihilo plus ad fines suos proficiebat; eo quod etiam illi qui proculdubio eum fuissent adjuturi, quid vellet non perciperent. Adeo ut tandem coactus sit tritam et vulgarem inire viam; ut scilicet, prætextu se Cæsari opponendi, arma et exercitum compararet. Adeo lenta, casibus obnoxia, et plerunque infœlicia, solent esse ea consilia quæ profunda dissimulatione obteguntur! Qua de re idem sensisse videtur Tacitus, cum simulationis artificia tanquam inferioris subsellii prudentiam constituit, præ artibus politicis: illam Tiberio, has vero Augusto Cæsari attribuens. Etenim, de Livia verba faciens, sic loquitur; quod fuisset illa *cum artibus mariti et simulatione filii bene composita.*[5]

Quod ad animum *flectendum* et *effingendum* attinet; totis viribus certe incumbendum ut animus reddatur occasionibus et opportunitatibus obsequens, neque ullo modo erga eas durus

[1] Cicero, Ep. ad Attic. x. 4.
[2] Ibid. xvi. 15.
[3] Tac. Hist. ii. 38.
[4] See, for the fragment of Sallust here referred to, Suetonius *De Claris Grammaticis*, c. 15.
[5] Tac. Annal. v. 1

aut renitens. Neque enim majus fuerit impedimentum ad res gerendas, aut fortunas hominum constituendas, quam illud *Idem manebat, neque idem decebat*[1]; videlicet, cum homines iidem sint, et natura sua utantur, postquam occasiones se mutaverint. Bene itaque Livius, cum Catonem Majorem introducit tanquam fortunæ suæ architectum peritissimum, illud subjungit; quod ei fuerit *ingenium versatile.*[2] Atque hinc fit, quod ingenia gravia et solennia et mutare nescia, plus plerunque habeant dignitatis quam fœlicitatis. Hoc vero vitium in aliquibus a natura penitus insitum est, qui suopte ingenio sunt viscosi, et nodosi, et ad versandum inepti. At in aliis consuetudine obtinuit (quæ est altera natura) atque opinione quadam (quæ in animos hominum facile obrepit), ut minime mutandam sibi putent rerum gerendarum rationem, quam prius bonam et prosperam sint experti. Prudenter enim observat Macciavellus in Fabio Maximo, quod *pristinum suum et inveteratum cunctandi et belli trahendi morem retinere mordicus voluerit, cum natura belli esset alia, et acriora postularet consilia.*[3] In aliis porro idem vitium ex inopia judicii progignitur, cum homines periodos rerum et actionum non tempestive discernant, sed tum demum se vertant postquam opportunitas jam elapsa sit. Tale quidpiam in Atheniensibus suis redarguit Demosthenes, eos aiens esse *rusticis similes, qui in ludo gladiatorio se probantes semper post plagam acceptam in eam partem muniendam scutum transferunt qua percussi sunt; non prius.*[4] In aliis rursus hoc ipsum contingit, quia operam in via ea quam semel ingressi sunt collocatam perdere gravantur, nec receptui canere sciunt; sed potius se occasionibus superiores fore constantia sua confidunt. Verum ista animi viscositas et renitentia, a quacunque illa tandem radice pullularit, rebus gerendis et fortunæ hominum est damnosissima; nihilque magis politicum quam animi rotas reddere cum rotis fortunæ concentricas et simul volubiles. Atque de præceptis duobus Summariis, circa Fortunæ Architecturam, hactenus. Præcepta autem Sparsa haud pauca sunt. Nos tamen perpauca deligemus, pro modo exempli.

Primum Præceptum est; Faber Fortunæ amusse[5] sua perite

[1] "Remanebat idem neque decebat idem" is said by Cicero, in speaking of the youthful character of the eloquence of Hortensius. See the *De claris Orat.* c. 95.

[2] Livy, xxxix. 40. [3] Macch. Discorsi, iii. 9.

[4] Demosth. 1 Philip. § 46. "Rustici" is in the original *βάρβαροι*; and the illustration is derived, not from fencing, but from boxing.

[5] The word amussis very seldom occurs, except in the phrase "ad amussim." Its

utatur, eamque rite applicet; hoc est, animum assuefaciat ut rerum omnium pretium et valorem æstimet prout ad fortunam et fines suos magis aut minus conducant; hocque curet sedulo non perfunctorie. Mira enim res, sed verissima; inveniuntur plurimi, quorum mentis *pars logica* (si ita loqui licet) est bona, *mathematica* pessima; videlicet, qui de rerum consequentiis satis firmiter judicant; de pretiis vero imperitissime. Hinc fit, ut alii privata et secreta cum principibus colloquia, alii auras populares, tanquam magna adepti, admirentur; cum sit utrunque sæpenumero res et invidia et periculo plena; alii autem res metiantur ex difficultate, atque opera sua in eis impensa; fieri oportere existimantes, ut quantum moverint tantum etiam promoverint; sicut Cæsar de Catone Uticensi, veluti per ironiam, dixit; narrando quam laboriosus fuerit et assiduus et quasi indefatigabilis, neque tamen multum ad rem; *Omnia* (inquit) *magno studio agebat.*[1] Hinc etiam illud accidit, ut homines sæpius seipsos fallant; qui si magni alicujus aut honorati viri opera utantur, sibi omnia prospera promittant; cum illud verum sit, non grandissima quæque instrumenta, sed aptissima, citius et fœlicius opus quodque perficere. Atque ad *mathematicam* veram animi informandam, operæ pretium est illud inprimis nosse et descriptum habere, quid ad cujusque fortunam constituendam et promovendam *primum* statui debeat, quid *secundum;* et sic deinceps. Primo loco, *Emendationem Animi* pono; animi enim impedimenta et nodos tollendo et complanando, citius viam fortunæ aperueris, quam fortunæ auxiliis animi impedimenta sustuleris. Secundo loco, *Opes* pono et *Pecuniam;* quam summo loco plurimi fortasse collocaverint, cum tanti sit ad omnia usus. Verum eam opinionem similem ob causam abjudico atque Macciavellus fecit, in alia re non multum ab ea discrepante. Cum enim vetus fuerit sententia, *Pecuniam esse nervos belli;* ille contra non alios esse nervos belli asseruit, quam *nervos virorum fortium et militarium.*[2] Eodem prorsus modo vere asseri possit, *nervos fortunæ* non esse pecuniam, sed potius *animi vires;* ingenium, fortitudinem, audaciam, constantiam, moderationem, industriam, et similia. Tertio loco, colloco *Famam* et *Existimationem;* eo magis quod illa æstus quosdam

ablative ought to be amussi, not amusse. I do not know whether there is authority for either form.

[1] The words of the original are "Hæc magno studio agebat." — *Cæsar. Bell. Civil.* i. 30.

[2] Macchiav. Discorsi, ii. 10. And for the opinion he refutes, see Cicero, Philipp. 5.

habeant et tempora, quibus si non opportune utaris, difficile erit rem in integrum restituere. Ardua enim res, Famam præcipitantem retrovertere. Postremo loco, pono *Honores*, ad quos certe facilior aditus per unumquodque ex illis tribus, multo magis per omnia conjuncta, datur, quam si ab Honoribus auspiceris et deinde ad reliqua perrexeris. Verum, ut in ordine rerum servando haud parum est momenti, ita non multo minus in servando ordine temporis; cujus perturbatione frequentissime peccatur; dum ad fines tum properatur quando initia essent curanda; atque dum ad maxima quæque subito advolamus, quæ in medio posita sunt temere transilientes. At illud recte præcipitur; *Quod nunc instat agamus.*[1]

Secundum Præceptum est, ut caveamus ne animi quadam magnitudine et præfidentia ad magis ardua quam par est feramur, neve in adversum fluvii remigemus. Optimum enim consilium circa fortunas hominum,

——— Fatis accede Deisque.[2]

Circumspiciamus in omnes partes, et observemus qua res pateant, qua clausæ et obstructæ sint, qua proclives, qua arduæ; neque viribus nostris, ubi non patet aditus commodus, abutamur. Hoc si fecerimus, et a repulsa nos immunes præstabimus; et in negotiis singulis nimis diu non hærebimus; et moderationis laudem reportabimus; et pauciores offendemus; et denique fœlicitatis opinionem acquiremus; dum quæ sponte fortasse eventura fuissent, nostræ industriæ accepta ferentur.

Tertium Præceptum cum proxime præcedente nonnihil pugnare videri possit; licet probe intellectum, minime. Illud hujusmodi est; ut occasiones non semper expectemus, sed eas quandoque provocemus et ducamus. Quod etiam innuit Demosthenes, magniloquentia quadam; *Et quemadmodum receptum est, ut exercitum ducat imperator; sic a cordatis viris res ipsæ ducendæ, ut quæ ipsis videntur ea gerantur, et non ipsi persequi eventus tantum cogantur.*[3] Etenim si diligenter attendamus, duas observabimus easque discrepantes species eorum qui rebus gerendis et negotiis tractandis pares habeantur. Alii siquidem occasionibus commode sciunt uti, sed nihil ex se moliuntur aut excogitant; alii toti sunt in machinando, qui occasiones quæ opportune incidunt non arripiunt. Harum

[1] Virg. Ecl. ix. 66. [2] Lucan, viii. 486. [3] Demosth. Philipp. 1. § 45.

facultatum altera, alteri non conjuncta, manca omnino et imperfecta censenda est.

Quartum est Præceptum, ut nihil suscipiamus in quo necesse sit temporis plurimum insumere; verum ut versiculus ille aurem semper vellicet;

Sed fugit interea, fugit irreparabile tempus.[1]

Neque alia subest causa cur ii qui professionibus laboriosis aut rebus similibus se addixerunt, veluti jureconsulti, oratores, theologi doctiores, librorum scriptores, et hujusmodi, in fortuna sua constituenda et promovenda minus sint solertes, quam quod tempore (alias scilicet insumpto) indigent ad particularia pernoscenda, opportunitates captandas, et machinas quæ ad fortunam suam spectent comminiscendas et meditandas. Quinetiam in aulis principum et rebuspublicis eos reperias et ad fortunam suam promovendam et ad aliorum invadendam maxime efficaces, qui nullo publico munere funguntur, sed in hoc de quo loquimur Ambitu Vitæ perpetuo occupantur.

Quintum est Præceptum, ut Naturam quodammodo imitemur, quæ *nihil facit frustra.* Id quod factu non erit admodum difficile, si negotia nostra omnium generum perite commisceamus et contexamus. In singulis enim actionibus ita animus est instituendus et præparandus, atque intentiones nostræ aliæ aliis substernendæ et subordinandæ, ut si in aliqua re voti compotes in *summo gradu* fieri non possimus, in *secundo* tamen liceat consistere, imo vel in *tertio;* quod si nec in aliqua omnino parte rei hærere aut consistere possimus, tum vero ad alium quempiam (præter destinatum) finem operam impensam flectamus; sin nec in *præsenti* aliquem fructum demetere queamus, saltem aliquid ex ea extrahamus quod in *futurum* prosit; si vero nihil *solidi* nec in præsenti nec in futuro inde elicere detur, satagamus saltem ut aliquid *existimationi* nostræ inde accrescat; et alia id genus; rationes semper a nobis ipsis exigendo, quibus constet nos fructus aliquid, plus minus, ex singulis actionibus et consiliis nostris percepisse; neque ullo modo permittendo, ut tanquam confusi ac consternati animum illico despondeamus, si forte scopum principalem non licuerit attingere. Nihil enim minus convenit viro politico, quam uni rei unice esse intentum. Qui enim hoc facit occasionum

[1] Virg. Georg. iii. 284.

innumerarum jactura mulctabitur, quæ rebus agendis ex obliquo intervenire solent; quæque fortasse magis fuerint propitiæ et commodæ ad alia quæ postea usui futura sint, quam ad ea quæ in manibus habeamus. Ideoque bene calleamus illam regulam, *Hæc oportet facere, et illa non omittere.*[1]

Sextum est Præceptum, ut nos rei alicui nimis peremptorie non astringamus, quanquam casui videatur primo intuitu minus obnoxia; sed semper habeamus vel fenestram apertam ad evolandum, vel posticum aliquod secretum ad redeundum.

Septimum Præceptum est antiquum illud Biantis; modo non ad perfidiam, sed ad cautionem et moderationem, adhibeatur; *Et ames tanquam inimicus futurus, et oderis tanquam amaturus.*[2] Nam utilitates quasque mirum in modum prodit et corrumpit, si quis nimium se immerserit amicitiis infœlicibus, molestis et turbidis odiis, aut puerilibus et futilibus æmulationibus.

Hæc, exempli loco, circa doctrinam de Ambitu Vitæ sufficient. Illud enim hominibus in memoriam subinde reducendum est, longe abesse ut adumbrationes istæ, quibus utimur in Desideratis, loco justorum tractatuum ponantur; sed sint solummodo tanquam schedæ aut fimbriæ, ex quibus de tela integra judicium fieri possit. Neque rursus ita desipimus, ut fortunam absque tanto quantum diximus molimine minime parari asseramus. Probe enim novimus, eam tanquam sponte in gremium aliquorum defluere; alii autem eam diligentia sola et assiduitate (cautione nonnulla aspersa) absque arte multa aut operosa

[1] St. Matth. xxiii. 23.; St. Luke, xi. 42.

[2] La Bruyère's remarks on this precept are, I think, worth transcribing: — "Vivre avec nos ennemis comme s'ils devoient un jour être nos amis, et vivre avec nos amis comme s'ils pouvoient devenir nos ennemis, n'est ni selon la nature de la haine, ni selon les règles de l'amitié: ce n'est point une maxime morale, mais politique. On ne doit pas se faire des ennemis de ceux qui mieux connus pourroient avoir rang entre nos amis. On doit faire choix d'amis si sûrs et d'une si exacte probité que venant à cesser de l'être, ils ne veuillent pas abuser de notre confiance, ni se faire craindre comme nos ennemis."—*Les Caractères*, c. 4

[La Bruyère's rule would, I think, be perfect, if it were possible to make a certain judgment of each man's character beforehand. The defect of it is, that, taking no account of the necessary uncertainty of all such judgments, it fails to give any practical direction in the real affairs of life. Put it thus: — "Treat no man as your enemy unless you are *sure* that he can never deserve to be your friend, make no man your friend unless you are *sure* that he will never become your enemy;"—and your practical direction becomes much the same as that of Bias. The question which in morals is really disputable is, whether a man should encourage himself to doubt other men, or not to doubt; and this, being a question of more or less, cannot be determined except in reference to particular cases. No man will say generally either that you cannot doubt too much, or that you cannot doubt too little. Perhaps the best general direction that can be given is to lean *against* your natural inclination, whichever way it goes. If you are naturally inclined to distrust appearances, trust them more; if to trust, trust them less.—*J. S.*]

adipiscuntur. Verum sicut Cicero, oratorem perfectum depingens, non id vult ut causidici singuli tales esse debeant aut possint: ac rursus, sicut in principe aut aulico describendo (quod nonnulli tractandum susceperunt[1]) modulus effingitur prorsus secundum artis perfectionem, non autem secundum practicam vulgatam; idem et nos in Politico instruendo præstitimus; *Politico* (inquam) *quoad fortunam propriam.*

Enimvero illud utique monendum, Præcepta quæ circa hanc rem delegimus et proposuimus, omnia ex genere eorum esse quæ *Bonæ Artes* vocantur. Quod enim ad *Malas Artes* attinet, si quis Macciavello se dederit in disciplinam, qui præcipit *virtutem ipsam non magnopere curandam, sed tantum speciem ejus in publicum versam; quia virtutis fama et opinio homini adjumento sit, virtus ipsa impedimento;* quique alio loco præcipit *ut homo politicus illud tanquam fundamentum prudentiæ suæ substernat; quod præsupponat homines non recte nec tuto ad ea quæ volumus flecti aut adduci posse, præterquam solo metu; ideoque det operam ut omnes, quantum in se est, obnoxii sint, atque in periculis et angustiis constituti*[2]: ita ut politicus suus videatur esse, quod Itali dicunt, *seminator spinarum;* aut si quis axioma illud quod a Cicerone citatur amplecti velit; *Cadant amici, dummodo inimici intercidant*[3]; sicut Triumviri fecerunt, qui inimicorum interitum amicissimorum exitio redimebant; aut si quis L. Catilinæ imitator esse velit, ut rerumpublicarum incendiarius fiat et perturbator, quo melius in aquis turbidis piscari et fortunam suam expedire possit; *Ego* (inquit), *si in fortunis meis incendium sit excitatum, id non aqua sed ruina restinguam*[4]; aut si quis illud Lysandri ad se transferat, qui dicere solebat *pueros placentis, viros perjuriis alliciendos*[5]; cum aliis ejusdem farinæ pravis ac perniciosis dogmatibus; quorum (ut fit in cæteris rebus omnibus) major est numerus quam rectorum et sanorum; si quis (inquam) hujusmodi inquinata prudentia delectetur; non iërim inficias eum (quandoquidem legibus charitatis et virtutis omnibus seipsum solutum fortunæ solummodo manciparit) posse majore compendio et celerius fortunam suam promovere.

[1] The allusion is probably to Macchiavelli's *Principe*, and to the *Cortigiano* of Castiglione.

[2] See for these two quotations Macchiavelli's *Principe*, c. 17, 18.

[3] "Pereant amici dummodo inimici intercidant."—*Cicero, Pro Deiotar.* c. 9.

[4] See Cicero, Pro Muræn. c. 25.; and compare Sallust, Catil. c. 31.

[5] Plutarch in Lysand. c. 8. The saying seems, however, not to be Lysander's. He apparently only adopted it from Polycrates of Samos.

Fit vero in vita, quemadmodum et in via, ut iter brevius sit fœdius et cœnosius; neque sane, ut per viam meliorem quis incedat, multa circuitione opus est.

Tantum vero abest ut homines ad hujusmodi artes pravas se applicare oporteat, ut potius sane (si modo sint apud se, seque sustinere valeant, neque ambitionis turbine et procella in adversum rapiantur) ante oculos proponere debeant non solum mundi chorographiam generalem illam, quod *omnia sint vanitas et vexatio spiritus*[1]; verum etiam et illam magis specialem, videlicet quod ipsum *Esse*, sejunctum a *Bene Esse*, maledictionis loco sit; et quo grandius sit Esse eo major sit maledictio; quodque amplissimum virtutis præmium sit ipsa virtus; quemadmodum et ultimum vitii supplicium est vitium ipsum; sicut egregie pöeta,

> Quæ vobis, quæ digna, viri, pro laudibus istis
> Præmia posse rear solvi? Pulcherrima primum
> Dii moresque dabunt vestri.[2]

Et e contra non minus vere ille de sceleratis, *Atque eum ulciscentur mores sui.*[3] Quinetiam mortales, dum in omnes partes cogitationes suas agitant et diffundunt ut fortunis suis recte prospectum atque consultum sit, interim in mediis illis animi transcursibus ad divina judicia et providentiam æternam oculos attollere debent; quæ sæpissime impiorum machinationes et consilia prava, licet profunda, subvertit et ad nihilum redigit; secundum illud Scripturæ, *Concepit iniquitatem, et pariet vanitatem.*[4] Imo, etsi injuriis et malis artibus abstineant, attamen hæc jugis et irrequieta anhelatio ad ardua fortunæ, absque cessatione et quasi sine sabbato, tributum temporis nostri Deo debitum minime solvit; qui, ut videre est, facultatum nostrarum decimas, temporis autem septimas exigit et sibi seponit. Quorsum enim fuerit os gerere in cœli sublimia erectum, mentem vero humi prostratam, et pulverem instar serpentis comedentem? Quod etiam ethnicos non fugit;

> Atque affigit humo divinæ particulam auræ.[5]

Quod si in hoc sibi quisquam adblandiatur, quod fortuna sua, utcunque eam malis artibus obtinuerit, recte uti decreverit; sicut de Augusto Cæsare et Septimio Severo solitum erat dici,

[1] Eccles. ii. 11.
[2] Virg. Æn. ix. 252.
[3] Cicero, Ep. ad Att. ix. 12.
[4] Ps. vii. 14. [or Job, xv. 35.]
[5] Hor. Sat. ii. 2. 79.

Debuisse illos aut nunquam nasci, aut nunquam mori[1]; tanta in ambitu fortunæ suæ patrarunt mala; tanta rursus summa adepti, contulerunt bona; intelligat nihilominus hanc malorum per bona compensationem post factum probari; consilium autem hujusmodi merito damnari. Abs re postremo nobis non fuerit, in cursu isto incitato et fervido versus fortunam nostram, frigidam paulisper aspergere, haustam e dicterio illo non inelegante Caroli Quinti Imperatoris, in Institutionibus suis ad filium; *Imitari Fortunam mores mulierum, quæ procos plus nimio ambientes plerunque superbe aversantur.*[2] Verum hoc ultimum remedium pertinet ad eos, quibus gustus ex morbo animi corruptus est. Innitantur potius homines lapidi illi, qui Theologiæ et Philosophiæ est tanquam angularis; quæ idem fere asserunt de eo, quod *primum quæri debeat.* Etenim Theologia edicit, *Primum quærite regnum Dei, et ista omnia adjicientur vobis*[3]: Philosophia autem simile quiddam jubet; *Primum quærite bona animi, cætera aut aderunt aut non oberunt.* Quamvis autem hoc fundamentum, humanitus jactum, interdum locetur super arenas; quemadmodum videre est in M. Bruto, qui in eam vocem sub exitum suum prorupit;

Te colui, Virtus, ut rem; ast tu nomen inane es;[4]

At idem fundamentum, divinitus locatum, firmatur semper in petra. Hic autem Doctrinam de Ambitu Vitæ, et simul Doctrinam Generalem de Negotiis, concludimus.

[1] See, with reference to Augustus, Aurelius Victor, *Epit.* c. 1.; and for Severus, his life by Lampridius.

[2] It was on being obliged to raise the siege of Metz that Charles V. remarked that Fortune was like a woman,—that, after having favoured him in his youth, she turned against him when he was no longer young. There are, I believe, several papers of instructions addressed by him to Philip II. In one or two which I have seen the remark mentioned in the text does not appear to occur.

[3] St. Matt. vi. 33.

[4] This line is of course a translation of the following:—

ὦ τλῆμον ἀρετὴ λόγος ἀρ' ἦσθ'· ἐγὼ δέ σε
ὡς ἔργον ἤσκουν, σὺ δ' ἀρ' ἐδούλευες τύχῃ,

which, according to Dio Cassius, xlvii., was the dying exclamation of Brutus. From the way in which the lines are introduced by Dio Cassius, they appear to be a fragment of a speech of Hercules in some lost tragedy. The first line and the first portion of the second (which, in effect, is all that is here translated) occur not only in Dio Cassius, but also in Plutarch, *De Superstitione*, where, however, no reference is made to Brutus. Most editions of Dio Cassius are accompanied by a Latin translation. In the earlier ones of those which I have seen, the words in question are given in prose, and in the later in Iambic verse.

CAPUT III.

Partitiones Doctrinæ de Imperio, *sive* Republica, *omittuntur; tantum aditus fit ad* Desiderata *duo; Doctrinam de* Proferendis Finibus Imperii, *et Doctrinam de* Justitia Universali, *sive de* Fontibus Juris.

Venio jam ad Artem Imperii, sive Doctrinam de Republica Administranda; sub qua etiam Œconomica continetur, ut Familia sub Civitate. In hac parte, sicut jam antea dixi, silentium mihi imperavi. Neque tamen prorsus diffidere debui, quin possim de illa fortasse non imperite aut inutiliter disserere; utpote qui longa experientia edoctus, et per tot munerum et honorum gradus ad amplissimum regni magistratum, favore Majestatis tuæ indulgentissimo, nullo merito meo, evectus fuerim; eundemque magistratum per annos quatuor integros gesserim; et quod pluris est, Majestatis tuæ mandatis et colloquiis per annos octodecim continuos assueverim (quod etiam e stipite aliquo politicum exculpere potuisset); quique etiam, inter omnes artes, plurimum temporis in historiis et legibus contriverim. Quæ omnia non jactantia ad posteros refero, sed quia ad literarum dignitatem nonnihil pertinere putem, quod homo quispiam ad literas potius quam ad aliud quicquam natus, et ad res gerendas nescio quo fato contra genium suum abreptus, ad civilia tamen munera tam honorifica et ardua sub rege prudentissimo assumptus fuerit. Verum, si quid circa Politicam posthac parturiet otium meum, erit fortasse proles aut abortiva aut posthuma. Interim, ne scientiis omnibus jam veluti in subselliis suis collocatis, sedes hæc tam excelsa omnino vacet, decrevi duas tantum Civilis Scientiæ portiones, quæ ad Arcana Imperii non pertinent, sed sunt naturæ magis communis, ut Desiderata notare, earumque more nostro Exempla proponere.

Cum Artes Imperii tria Officia Politica complectantur; primo, ut Imperium *conservetur;* secundo, ut *beatum efficiatur et florens;* tertio, ut *amplificetur finesque ejus longius proferantur;* de duobus primis Officiis maxima ex parte egregie a nonnullis tractatum est; de tertio siletur. Illud itaque inter Desiderata reponemus, et more nostro Exemplum ejus proponemus; eam doctrinæ partem *Consulem Paludatum,* sive Doctrinam *de Proferendis Imperii Finibus,* nominantes.

Exemplum Tractatus Summarii de Proferendis Finibus Imperii.

DICTUM Themistoclis, sibi ipsi applicatum, incivile certe fuit et inflatum; sin de aliis, atque in genere, prolatum fuisset, prudentem sane observationem et pergravem censuram complecti videatur. Rogatus in convivio ut citharam pulsaret, respondit; *Fidibus se nescire; cæterum posse oppidum parvum in magnam civitatem evehere.*[1] Ista certe verba, ad sensum politicum translata, facultates duas multum inter se discrepantes, in iis qui rerum gubernacula tractant, optime describunt et distinguunt. Etenim si regum consiliarios, senatores, aliosque ad negotia publica admotos, qui usquam fuerunt, attente intueamur, reperientur profecto (licet rarissime) nonnulli qui regnum aut civitatem e parvis ampla efficere possint, fidicines tamen sint valde imperiti; e contra autem, alii quamplurimi in cithara aut lyra (hoc est, aulicis tricis) miri artifices, qui tantum abest ut rempublicam amplificare possint, ut potius a natura comparati videantur ad statum reipublicæ beatum et florentem labefactandum et evertendum. Sane artes illæ degeneres et præstigiæ, quibus sæpenumero consiliarii atque rerum potentes et gratiam apud principes suos et famam in vulgus reportant, haud aliud nomen merentur quam peritiæ cujusdam fidiculariæ; utpote cum sint res magis gratæ in præsens, et artificibus ipsis ornamento, quam ad rerumpublicarum, quarum sunt ministri, opes et amplitudinem utiles aut accommodæ. Occurrent proculdubio et alii consiliarii atque reipublicæ gubernatores minime spernendi, qui sint negotiis pares, possintque res commode administrare, easque a manifestis præcipitiis et incommodis conservare; a virtute tamen illa rerumpublicarum erectrice et amplificatrice longo intervallo absunt.

Verum qualescunque demum fuerint operarii, conjiciamus oculos in opus ipsum; qualis nimirum censeri debeat vera Regnorum et Rerumpublicarum Magnitudo, et quibus artibus obtineri possit: Dignum profecto argumentum, quod principes perpetuo in manibus habeant et diligenter meditentur; quo nec vires suas in majus æstimantes incœptis se vanis et nimis arduis implicent; nec rursus easdem plus æquo despicientes ad consilia pusillanima et meticulosa se demittant.

Magnitudo Imperiorum, quoad molem et territorium, mensuræ subjicitur; quoad reditus, calculis. Numerus civium et

[1] Plut. in Them. 2.

capita, censu; urbium et oppidorum multitudo et amplitudo, tabulis excipi possint. Attamen non reperitur inter civilia res errori magis obnoxia, quam verum et intrinsecum excipere valorem circa vires et copias imperii alicujus. Assimilatur Regnum Cœlorum non glandi aut nuci alicui grandiori, sed *grano sinapis*, quod inter grana est minimum; quod tamen habeat interim intra se proprietatem quandam et spiritum innatum, quo se et citius attollat et latius diffundat. Eodem modo, invenire est regna et status, ambitu quidem et regionum tractu valde ampla, quæ tamen ad *fines ulterius proferendos*, aut latius imperandum, sunt minus apta; alia contra, dimensione satis exigua, quæ tamen bases in quibus maximæ monarchiæ inædificentur esse possint.

1. Urbes munitæ, plena armamentaria, equorum propagines generosæ, currus armati, elephanti, machinæ atque tormenta bellica omnigena, et similia; sunt certe ista universa nihil aliud quam ovis induta pelle leonina, nisi gens ipsa stirpe sua et ingenio sit fortis et militaris. Imo, nec numerus ipse copiarum multum juvat, ubi milites imbelles sunt et ignavi. Recte enim Virgilius; *Lupus numerum pecorum non curat.*[1] Exercitus Persarum in campis Arbelæ oculis Macedonum, tanquam vastum hominum pelagus, subjiciebatur; adeo ut duces Alexandri, nonnihil ipso spectaculo perculsi, regem interpellarent, atque ut noctu prælium committeret ei auctores erant; quibus ille, *Nolo* (inquit) *suffurari victoriam.*[2] Ea autem etiam opinione fuit facilior. Tigranes Armenius, castrametatus in quodam colle cum exercitu quadringentorum millium, cum spectaret aciem Romanorum, quæ quatuordecim millia non excessit, contra se tendentem, in dicterio illo suo sibi complacuit; *Ecce* (inquit) *hominum pro legatione nimio plus quam oportet, pro pugna longe minus.*[3] Eosdem tamen, priusquam occubuisset sol, satis multos ad illum infinita strage profligandum expertus est. Innumera sunt exempla, quam sit multitudinis cum fortitudine congressus impar. Primo igitur pro re certissima et exploratissima decernatur et statuatur, quod caput omnium quæ ad magnitudinem regni aut status spectent sit ut *populus ipse sit stirpe et ingenio bellicosus.* Atque illud magis tritum quam verum, quod *nervi belli sint pecuniæ;* si desint nervi

[1] Virg. Ecl. vii. 52
[2] Vide sup. p. 475.
[3] Plutarch, in Lucull., and Appian, Bell. Mithrid. c. 85

lacertorum in gente molli et effœminata. Recte enim Crœso ostentanti aurum respondit Solon; *At si quis (o rex) venerit, qui melius quam tu ferrum gestet, illi profecto totum hoc cedet aurum.*[1] Quare quicunque is tandem sit princeps aut status cujus subditi nativi et indigenæ non sint animosi et militares, potentiam suam admodum sobrie æstimet; atque e contra principes qui dominantur in gentes animosas et martias, norint illi satis vires suas, si sibi alias non desint. Quod attinet ad *copias mercenarias* (quod solet adhiberi remedium cum copiæ nativæ desint), plena sunt omnia exemplis, quibus liquido patet quod quicunque status illis innitetur, poterit fortasse pennas ad tempus breve nido majores extendere, sed defluent illæ paulo post.

2. Benedictio Judæ et Issacharis in unum nunquam convenient; nimirum, ut eadem tribus aut gens sit simul et *leonis catulus*, et *asinus procumbens inter sarcinas.*[2] Neque unquam fiet, ut populus tributis oppressus fortis existat et bellicosus. Verum est, collationes publico consensu factas minus animos subditorum dejicere et deprimere, quam quæ ex imperio mero indicuntur. Id quod liquido videre est in tributis Germaniæ Inferioris, quas *Excisas*[3] vocant; atque aliqua ex parte, in iis quæ *Subsidia* nominantur apud Anglos. Etenim notandum est, sermonem jam institui de animis hominum, non de opibus. Tributa autem quæ ex consensu conferuntur, et quæ ex imperio imponuntur, etsi eadem res sint quoad opes exhauriendas, varie tamen omnino animos subditorum afficiunt. Statuatur igitur et hoc, populum tributis gravatum idoneum ad imperandum non esse.

3. Aspirantibus ad magnitudinem regnis et statibus prorsus cavendum, ne Nobiles et Patricii, atque (quos vocamus) Generosi majorem in modum multiplicentur. Hoc enim eo rem deducit, ut Plebs regni sit humilis et abjecta, et nihil aliud fere

[1] For the epigrammatic antithesis of gold and iron, see the conversation of Solon and Crœsus in Lucian's *Charon.*

[2] Genes. xlix. 9. 14.

[3] The excise, or accise (from acciisse) was originally in the Low Countries a municipal tax; it seems to have arisen from a privilege granted by Charles V. in 1536 to certain towns, of imposing duties on wine, beer, and woollen and silken stuffs. See *Histoire Générale des Provinces-Unies*, i. 236. That the inhabitants of these countries were from an early time jealous of the administration of public money appears from the following passage from *Meteranus:* "Status Belgici, Italico et Gallico gravati bello, novennalem exactionem Regi consentiunt: harum autem pecuniarum administrationem et præsidiorum atque turmarum publice merentium satisfactionem suo officio reservant: quæ res multis sibi id arrogantibus non parum displicuit: hinc Regis subditorumque mutua alienatio et offensio orta, cum Regi esset persuasum, hoc modo suæ majestati summopere derogari."— *Hist. Belg. Meter.* in anno 1554.

quam nobilium mancipia et operarii. Simile quiddam fieri videmus in sylvis cæduis; in quibus, si major quam par est caudicum sive arborum majorum relinquatur numerus, non renascetur sylva sincera et pura; sed major pars in vepres et dumos degenerabit. Eodem modo in nationibus, ubi numerosior justo est nobilitas, erit plebs vilis et ignava; atque eo demum res redibit, ut nec centesimum quodque caput sit ad galeam portandam idoneum; præsertim si peditatum spectes, qui exercitus plerunque est robur præcipuum; unde succedet magna populatio, vires exiguæ. Nusquam gentium hoc quod dico luculentius comprobatum est, quam exemplis Angliæ et Galliæ; quarum Anglia, quamvis territorio et numero incolarum longe inferior, potiores tamen partes fere semper in bellis obtinuit; hanc ipsam ob causam, quod apud Anglos coloni et inferioris ordinis homines militiæ habiles sint, rustici Galliæ non item. Qua in re mirabili quadam et profunda prudentia excogitatum est ab Henrico Septimo Angliæ rege (id quod in Vitæ ejus Historia fusius tractavimus), ut prædia minora atque domus agricolationis instituerentur, quæ habeant certum eumque mediocrem agri modum annexum, qui distrahi non possit; eo fine ut ad victum liberaliorem sufficiat, utque agricultura ab iis exerceretur qui domini fuerint fundi, aut saltem usufructuarii, non conductitii aut mercenarii. Nam ita demum characterem illum, quo antiquam Italiam insignivit Virgilius, merebitur regio aliqua;

—— Terra potens armis, atque ubere gleba.[1]

Neque prætereunda est illa pars populi (quæ Angliæ fere est peculiaris, nec alibi (quod scio) in usu, nisi forte apud Polonos), *famuli* scilicet *Nobilium*. Hujus enim generis etiam inferiores, quoad peditatum, agricolis ipsis minime cedunt. Quare certissimum est, quod magnificentia et splendor ille hospitalis, atque famulitia et veluti satellitia ampla, quæ in more sunt apud Nobiles et Generosos in Anglia, ad potentiam militarem apprime conducant; ubi contra, Nobilium obscura et magis privata et in se reducta vitæ ratio copias militares minuit.

4. Danda est omnino opera ut Arbor ista Monarchiæ, qualis fuit Nebuchadnezzaris[2], truncum habeat satis amplum et robustum ad ramos suos et frondes sustentandos; hoc est, ut numerus indigenarum ad subditos extraneos cohibendos satis

[1] Virg. Æn. i. 531.

[2] Daniel, c. iv.

superque sufficiat. Illi igitur status ad Imperii Magnitudinem bene comparati sunt, qui Jus Civitatis facile et libenter largiuntur. Vana siquidem fuerit opinio, posse manipulum hominum, utcunque animis et consilio excellant, regiones nimio plus amplas et spatiosas imperii jugo cohibere et frænare. Id ad tempus fortasse facere possint, sed diuturnitatem hæc res non assequitur. Spartani parci fuerunt et difficiles in cooptandis novis civibus. Unde, donec intra parvos limites dominati sunt, res eorum firmæ fuerunt et stabiles; at postquam limites suos cœpissent proferre, et latius dominari quam ut stirps Spartanorum turbam exterorum imperio commode coercere posset, potentia eorum subito corruit. Nulla unquam respublica sinus suos ad novos cives recipiendos tam profuse laxavit, quam respublica Romana. Itaque par erat instituto tam prudenti fortuna; cum in imperium toto orbe amplissimum succreverint. Moris apud eos erat, Jus Civitatis prompte elargiri; idque in supremo gradu; hoc est, non solum Jus Commercii, Jus Connubii, Jus Hæreditatis; verum etiam Jus Suffragii, et Jus Petitionis sive Honorum; hocque rursus non singulis tantum personis, sed totis familiis, imo civitatibus, et nonnunquam integris nationibus, communicarunt. Huc adde consuetudinem deducendi Colonias, quibus Romanæ stirpes in solum exterum transplantabantur. Quæ duo instituta si simul componas, dices profecto non Romanos se diffudisse super universum orbem; sed contra orbem universum se diffudisse super Romanos; quæ securissima proferendi imperii est ratio. Subit mirari sæpius imperium Hispanorum, quod tam paucis indigenis tot regna et provincias amplexari et frænare possit. At certe Hispaniæ ipsæ pro arboris stemmate satis grandi haberi debent; cum longe ampliorem contineant regionum tractum quam Romæ aut Spartæ sub initiis suis contigerat. Porro, quanquam Jus Civitatis satis parce soleant Hispani impertire, quod proximum tamen est faciunt; quippe qui cujuscunque nationis homines ad militiam suam ordinariam promiscue admittant. Quinetiam summum belli imperium haud raro ad duces natione non Hispanos deferunt.[1] Attamen et illam ipsam videntur non ita pridem indigenarum paucitatem sensisse, eique succurrere

[1] E. g. Bourbon, Prosper Colonna, Pescara, Egmont, Castaldo, Parma, Piccolomini, Spinola. Of these, however, one or two might almost be called Spaniards; and it must be remembered that the dominions both of Charles V. and of his successors extended beyond the natural limits of the Spanish monarchy.

cupiisse; ut ex Pragmatica Sanctione, hoc anno promulgata, cernere est.[1]

5. Certissimum est Artes Mechanicas Sedentarias, quæ non sub dio sed sub tecto exercentur, atque Manufacturas Delicatas (quæ digitum potius quam brachium requirunt), sua natura militaribus animis esse contrarias. In universum, populi belli-

[1] In 1618, the Cortes, among other projects of reformation, petitioned the king not to grant any licences for monastic foundations.

The excessive multiplication of religious houses had attracted the attention of the government long before; and the opinions of a number of ecclesiastics were taken on the subject, in 1603, but nothing further seems to have been done. Subsequently however to the representation of the Cortes, the state of the kingdoms belonging to the crown of Castile was referred by the king to the council of Castile; and their report, which is given at full length in Davila's *Life of Philip the Third* (see chap. 86.), is known as the *Gran Consulta de* 1619. The distress and depopulation of the parts of Spain to which it refers are stated in very strong language, the causes assigned being mainly excessive and oppressive taxation, the increase of luxury, and the non-residence of the rich on their estates. To relieve the revenue, the revocation of royal grants, when any fair reason could be found for doing so, is recommended. Sumptuary laws are also proposed, and some regulations tending to the relief of the agricultural class. The king is also advised to be cautious in granting licenses to religious houses. Ortiz states expressly that no measures were taken to carry out the recommendation of the council during the reign of Philip the Third; a statement which seems to be fully confirmed by the silence of so copious and seemingly so painstaking an annalist as Gonzalez Davila. The assertion to be found in some French and English books, that the king made a decree in virtue of which those who introduced agricultural improvements on their estates were ennobled, is in itself exceedingly improbable, and has perhaps no other foundation than the imagination of some French economist who may have been misled by the circumstance that in the Cortes of 1618 something was done with respect to proofs of nobility. I speak however without having seen Navarrete's *Conservacion della Monarquía*. Soon after the accession of Philip the Fourth a royal decree or *Pragmática* was published which attempted to carry out some of the recommendations of the council, and which gave certain privileges to persons who married, and further immunities to those who had six children. For some account of its provisions, see Cespedes' *History of the first Six Years of Philip the Fourth* (published at Lisbon in 1631, and reprinted in Spain in 1634), book 3. cc. 17, 18. Cespedes does not precisely fix the date of the decree, but it was plainly issued some time in the summer of 1622, and is no doubt that to which Bacon refers. The date assigned by Desormeaux, namely the 10th of February 1624, is manifestly wrong; the sumptuary part of the enactment was suspended on the occasion of the visit of Prince Charles in 1623. See Mead's Letters to Stuteville, in *Ellis's Letters*.

It is a historical commonplace to assert that the depopulation of Spain was caused by the expulsion of the Moriscos, but this alone could not have produced so permanent an effect. The energies of the country were exhausted by excessive and unequal taxation; and the increase of the number of religious houses, especially of those belonging to the Mendicant Orders, aggravated the evil. Ranke has justly remarked that Spain must always have been a thinly peopled country; and he might have added, a country in which there seems always to have been a tendency to become depopulated. Thus in a passage of the *Siete Partidas*, quoted in the *Gran Consulta*, it is said to be part of the duty of the king to see that the population of places does not fall off. Even the word *despoblado* suggests a different idea from that which is expressed by weald or wilderness. It may be well to remark that there seems no reason to doubt that the population of Spain is much greater now than it was in the 16th century, although for a considerable time there must have been a decrease. Cassmany, in an interesting essay on the subject, has shown how much exaggeration there is in the statements made by Spanish writers of the 16th and 17th centuries, as to the population and manufacturing industry of the country in earlier times. According to him the population reached its minimum about 1700.

cosi feriari gaudent; et pericula quam labores minus exhorrent. Atque in hoc ingenio suo non sunt admodum reprimendi, si animos ipsorum in vigore conservare cordi nobis sit. Magno itaque adjumento Spartæ, Athenis, Romæ, aliisque antiquis rebuspublicis fuit, quod habuerint non Ingenuos, sed Servos plerunque, quorum laboribus istiusmodi opificia expediebantur. Verum mancipiorum usus, post legem Christianam receptam, maxima ex parte abiit in desuetudinem. Huic vero rei proximum est, ut artes istæ alienigenis tantum permittantur, qui propterea alliciendi aut saltem facile recipiendi sunt. Nativorum autem plebs ex tribus generibus hominum constare debet; nempe ex agricolis, famulis ingenuis, et artificibus quorum opera robur et lacertos viriles postulant; cujusmodi sunt fabri ferrarii, lapidarii, lignarii, et similes; non annumerando militiam descriptam.

6. Ante omnia ad Imperii Magnitudinem confert, ut gens aliqua armorum studium profiteatur, tanquam decus suum, et institutum vitæ primarium, et in præcipuo honore habitum. Quæ enim a nobis adhuc dicta sunt, ad habilitates tantum erga arma spectant; quorsum autem habilitas, si non rei ipsi incumbitur, ut producatur in actum? Romulus (ut narrant, aut fingunt) postquam e vivis excesserat illud civibus suis legavit, ut ante omnia rem militarem colerent, unde in caput orbis terrarum urbs eorum insurgeret.[1] Imperii Spartani fabrica universa (non nimis prudenter quidem, sed diligenter tamen) ad illum finem et scopum composita est et constructa, ut cives sui belligeratores essent. Persarum et Macedonum idem erat institutum, sed non tam constans aut diuturnum. Britanni, Galli, Germani, Gothi, Saxones, Normanni, et nonnulli alii, etiam ad tempus armis se præcipue dediderunt. Turcæ idem institutum, lege sua haud paululum extimulati, hodie retinent, sed magna cum militiæ suæ (ut nunc est) declinatione. In Europa Christiana, gens quæ illud adhuc retinet et profitetur soli sunt Hispani. Verum res est tam liquida et manifesta, unumquemque in eo proficere maxime in quo plurimum impendit studii, ut verbis non indigeat. Satis sit innuisse, desperandum omnino alicui nationi esse, quæ non ex professo arma et militiam colat iisque præcipue studeat et incumbat, sibi veluti ultro obventuram insignem aliquam Imperii Magnitudinem;

[1] Liv. i. 16.

contra autem, certissimum esse temporis oraculum, nationes illas quæ in armorum professione et studiis diutius permanserint (id quod Romani Turcæque potissimum fecere), miros in Imperio Amplificando facere progressus. Quin et illæ quæ bellica gloria per unius tantummodo sæculi spatium floruere, inde tamen unico illo sæculo eam Imperii Amplitudinem assecutæ sunt, quam longo post tempore, etiam remissa illa armorum disciplina, retinuerunt.

7. Præcepto præcedenti affine est, ut status quis utatur ejusmodi Legibus et Consuetudinibus, quæ justas illi causas aut saltem prætextus arma capessendi tanquam in promptu ministrent. Etenim ea est insita animis hominum justitiæ apprehensio, ut bellum (quod tot sequuntur calamitates) nisi gravem ob causam, saltem speciosam, inferre abstineant. Turcis præsto est semper, et ad nutum, belli causa; propagatio scilicet legis et sectæ suæ. Romani, quanquam pro magno decore imperatoribus apud eos fuerit si Fines Imperii ipsorum protulissent, tamen ob hanc solam causam, ut fines proferrentur, nunquam bella susceperunt. Aspiranti igitur ad imperium nationi illud in more sit, ut sensum habeat vividum et acrem injuriæ alicujus vel subditis suis limitaneis vel mercatoribus vel publicis ministris illatæ; neque a prima provocatione diutius torpeat aut tardet. Item, prompta sit et alacris ad auxilia mittenda sociis suis et fœderatis; id quod perpetuum erat apud Romanos; adeo ut si forte in populum fœderatum, cui etiam cum aliis fœdus defensivum intercederet, hostilis impressio facta esset, atque ille a plurimis suppetias peteret, Romani omnium primi semper adessent, beneficii decus nemini præripiendum relinquentes. Quod vero attinet ad bella antiquis temporibus propter statuum conformitatem quandam, aut correspondentiam tacitam, gesta, non video in quo jure illa fundata sint. Talia fuerunt bella quæ a Romanis suscepta erant ad Græciam in libertatem vindicandam; talia a Lacedæmoniis et Atheniensibus ad constituendas aut evertendas democratias et oligarchias; talia quandoque illata sunt a rebuspublicis aut principibus, sub prætextu subditos alienos protegendi et a tyrannide liberandi. Ad rem præsentem sufficiat, ut illud decernatur; non esse expectandum statui alicui Imperii Amplitudinem, nisi ad quamvis occasionem justam se armandi protinus expergiscatur.

8. Nullum omnino corpus, sive sit illud naturale sive politicum, absque exercitatione sanitatem suam tueri queat. Regno

autem aut reipublicæ, justum atque honorificum bellum loco salubris exercitationis est. Bellum civile profecto instar caloris febrilis est; at bellum externum instar caloris ex motu, qui valetudini inprimis conducit. Ex pace enim deside atque torpente, et emolliuntur animi et corrumpuntur mores. Sed utcunque res se habeat, quatenus ad alicujus status fœlicitatem, Magnitudinis proculdubio interest ut quasi semper in armis sit. Atque exercitus veteranus perpetuo tanquam sub vexillis habitus, etsi res sit magni proculdubio sumptus et impensæ, attamen ejusmodi est ut statui alicui quasi arbitrium rerum inter vicinos, aut saltem plurimum existimationis ad omnia conferat. Id quod insigniter cernere est in Hispanis, qui jam per annos centum et viginti exercitum veteranum ad aliquas partes, licet non semper ad easdem, aluerunt.[1]

9. Maris Dominium monarchiæ quædam epitome est. Cicero, de Pompeii contra Cæsarem apparatu scribens ad Atticum: *Consilium* (inquit) *Pompeii plane Themistocleum est; putat enim, qui mari potitur, eum rerum potiri.*[2] Atque Cæsarem Pompeius proculdubio delassasset et attrivisset, nisi inani fiducia inflatus ab illo incœpto destitisset. Prælia navalia quanti fuerint momenti, ex multis exemplis patet. Pugna ad Actium orbis imperium determinavit. Pugna ad Insulas Cursolares circulum in naribus Turcæ posuit.[3] Multoties certe evenit, ut victoriæ navales finem summæ belli attulerint; sed hoc factum est, cum aleæ hujusmodi præliorum totius belli fortuna commissa est. Illud minime dubium, quod qui maris potitur dominio in magna libertate agit, et tantum quantum velit de bello sumere potest; ubi contra, qui terrestribus copiis est superior, nihilominus plurimis angustiis conflictatur. At hodie, atque apud nos Europæos, si unquam aut uspiam, potentia navalis (quæ quidem huic regno Britanniæ in dotem cessit) summi ad rerum fastigia momenti est; tum quia pleraque Europæ regna mediterranea simpliciter non sunt, sed maxima ex parte mari cincta; tum etiam quia utriusque Indiæ thesauri et opes imperio maris veluti accessorium quiddam existunt.

[1] Commencing, that is, with the wars in Italy which arose out of the invasion of that country by Charles VIII.

[2] Cicero, Ep. ad Att. x. 8.

[3] The Insulæ Cursolares or Kurzolari islands are the ancient Echinades. The naval engagement generally, though perhaps incorrectly, called the Battle of Lepanto, took place off these islands in 1571. The Turkish fleet was defeated with great loss. It was on this occasion that Cervantes lost his hand.

10. Bella moderna veluti in tenebris gesta censeri possunt, præ gloria et decore vario quæ in homines militares priscis temporibus a rebus bellicis resilire solebant. Habemus hodie, fortasse ad animos faciendos, Ordines quosdam honorificos militiæ; qui tamen jam facti sunt et armis et togæ communes. Etiam in Scutis Gentilitiis Stemmata nonnulla habemus; insuper, Hospitia quædam Publica militibus emeritis et mutilatis destinata, et hujusmodi. Verum apud veteres, in locis ubi victoriæ partæ sunt extructa Trophæa; Laudationes Funebres, et Monumenta Magnifica occumbentium in bello; Coronæ Civicæ, Militares, singulis concessæ; nomen ipsum Imperatoris, quod postea reges maximi a belli ducibus mutuati sunt; redeuntium ducum, bellis prospere confectis, celebres Triumphi; Donativa atque Largitiones ingentes in milites sub exercituum dimissionem; hæc (inquam) tot et tanta fuerunt, et tam insigni splendore coruscantia, ut pectoribus mortalium etiam maxime conglaciatis igniculos subdere, eaque ad bellum inflammare potuerint. Ante omnia vero, mos ille Triumphandi apud Romanos non res erat ex pompa, aut spectaculum quoddam inane, sed inter prudentissima plane nobilissimaque instituta numerandus; utpote, qui in se hæc tria haberet; Ducum Decus et Gloriam; Ærarii ex spoliis Locupletationem; et Donativa Militum. Verum honor Triumphi fortasse monarchiis non competit præterquam in personis regis ipsius aut filiorum regis; quod etiam temporibus Imperatorum Romæ obtinuit; qui honorem ipsum triumphi sibi et filiis suis, de bellis quæ præsentes ipsi confecerant, tanquam peculiarem reservarunt; Vestimenta autem solummodo et Insignia Triumphalia aliis ducibus indulserunt.

Verum, ut sermones hos claudamus, nemo est (ut testatur Sacra Scriptura), *qui sollicite cogitando potest apponere ad staturam suam cubitum unum* [1]; in pusillo scilicet corporis humani modulo; cæterum in magna regnorum et rerumpublicarum fabrica imperium amplificare et fines proferre, reges penes et dominantes est. Nam prudenter introducendo leges, instituta, et consuetudines, quales jam proposuimus, et alias his similes, posteris et sæculis futuris magnitudinis sementem fecerint. Verum ista consilia apud principes raro tractantur, sed res fortunæ plerunque committitur.

[1] S. Matthew, vi. 27. S. Luke, xii. 25.

Atque hæc habuimus, quæ de Proferendis Imperii Finibus in præsentia occurrunt. Verum quorsum ista commentatio; cum Monarchia Romana futura sit inter mundanas (ut creditur) ultima? Nisi quod nobis, instituto nostro fidis neque uspiam de via declinantibus, (quandoquidem Amplificatio Imperii fuerit inter Officia tria Politices tertium) illud omnino prætermittere non licuerit. Restat jam Desideratum alterum, ex iis quæ posuimus duobus; nimirum, de Justitia Universali, sive de Fontibus Juris.

Qui de Legibus scripserunt, omnes vel tanquam Philosophi vel tanquam Jurisconsulti argumentum illud tractaverunt. Atque Philosophi proponunt multa dictu pulchra, sed ab usu remota. Jurisconsulti autem, suæ quisque patriæ legum, vel etiam Romanarum aut Pontificiarum, placitis obnoxii et addicti, judicio sincero non utuntur; sed tanquam e vinculis sermocinantur. Certe cognitio ista ad viros civiles proprie spectat; qui optime norunt quid ferat societas humana, quid salus populi, quid æquitas naturalis, quid gentium mores, quid rerumpublicarum formæ diversæ; ideoque possint de Legibus, ex principiis et præceptis tam æquitatis naturalis quam politices, decernere. Quamobrem id nunc agatur, ut Fontes Justitiæ et Utilitatis Publicæ petantur, et in singulis Juris partibus Character quidam et Idea Justi exhibeatur, ad quam particularium regnorum et rerumpublicarum leges probare, atque inde emendationem moliri, quisque cui hoc cordi erit et curæ possit. Hujus igitur rei, more nostro, Exemplum in uno titulo proponemus.

Exemplum Tractatus de Justitia Universali, *sive de* Fontibus Juris, *in uno titulo, per Aphorismos.*

PROŒMIUM.

APHORISMUS 1.

In Societate Civili, aut *Lex* aut *Vis* valet. Est autem et vis quædam legem simulans, et lex nonnulla magis vim sapiens quam æquitatem juris. Triplex est igitur Injustitiæ Fons; Vis mera; Illaqueatio malitiosa prætextu Legis; et Acerbitas ipsius Legis.

APHORISMUS 2.

Firmamentum Juris Privati tale est. Qui injuriam facit, re utilitatem aut voluptatem capit, exemplo periculum. Cæteri

utilitatis aut voluptatis illius participes non sunt, sed exemplum ad se pertinere putant. Itaque facile coëunt in consensum, ut caveatur sibi per Leges; ne injuriæ per vices ad singulos redeant. Quod si ex ratione temporum et communione culpæ id eveniat, ut pluribus et potentioribus per legem aliquam periculum creetur quam caveatur, factio solvit legem; quod et sæpe fit.[1]

APHORISMUS 3.

At Jus Privatum sub tutela Juris Publici latet. Lex enim cavet civibus, magistratus legibus. Magistratuum autem authoritas pendet ex majestate imperii, et fabrica politiæ, et legibus fundamentalibus. Quare, si ex illa parte sanitas fuerit et recta constitutio, leges erunt in bono usu; sin minus, parum in iis præsidii erit.

[1] The doctrine of this aphorism resembles that of Hobbes, inasmuch as there is no recognition of the principle that moral ideas lie at the root of civil rights. All the evidence of which the nature of the subject admits tends to show that society has always been held together, not by fear, but by notions more or less perfectly developed of the distinction between right and wrong; and to assert that in the absence of any such notions selfish fear could serve as the "firmamentum juris privati," is at best to assert that which never has been proved and never can be.

Of course it is not meant to deny that fear is the principle by means of which the moral force of society becomes efficient in the repression of crime.

[That a notion of the distinction between right and wrong in general lies at the bottom of all our notions of individual rights and wrongs; that when we think of one man as doing an *injury* to another, we think of him as doing something not only in its effect hurtful, but in its nature unjust; I do not think Bacon would have denied. That in the absence of any such notion the interest which all men have in protection from injury would lead them to concur in the measures necessary to secure protection to each, he would not, I think, have affirmed. But such questions did not enter into the practical problem with which he had to deal; which was this: Given our common notions of right and wrong, *jus* and *injuria*, with all their constituent elements, what is the principle by which they are made to bear upon the protection of individuals? To this he answers: It is the interest which each individual has in being himself protected. That the personal interest would be insufficient without the sanction of the "moral idea" to stimulate and support it, is probably true; for we see that actions the most dangerous to society, if committed by madmen, and therefore not objects of moral disapprobation, are exempted from punishment; the necessity of self-defence requiring only that measures be taken to prevent the recurrence of them, and the sense of justice refusing to sanction any further severity. But that the "moral idea," unassisted by the sense of personal interest, could be still less relied upon as a "firmamentum privati juris," seems to me still more certain; for we see that the penalties exacted or denounced by the laws, though proportioned with tolerable accuracy to the *danger* of the offence, bear no proportion at all to the moral disapprobation of which it is the object. Actions which are morally wrong in the highest degree, if they be such as every man may protect himself against, are not punished at all. Actions which the moral sense scarcely condemns, if such that the general permission of them would entail a general insecurity of property, are punished with great severity. And the truth seems to be, that to make an action seem a fit object of punishment, there must be *something* morally offensive in it, but that the nature and amount of punishment varies according to the interest of society in preventing it, and the difficulty of effecting that end. Men are not content with less severity than they think necessary for their protection, nor do they feel justified in using more.—*J. S.*]

APHORISMUS 4.

Neque tamen Jus Publicum ad hoc tantum spectat, ut addatur tanquam custos Juri Privato, ne illud violetur, atque ut cessent injuriæ; sed extenditur etiam ad religionem et arma et disciplinam et ornamenta et opes, denique ad omnia circa Bene Esse civitatis.

APHORISMUS 5.

Finis enim et scopus quem leges intueri, atque ad quem jussiones et sanctiones suas dirigere debent, non alius est quam ut cives fœliciter degant. Id fiet, si pietate et religione recte instituti; moribus honesti; armis adversus hostes externos tuti; legum auxilio adversus seditiones et privatas injurias muniti; imperio et magistratibus obsequentes; copiis et opibus locupletes et florentes fuerint. Harum autem rerum instrumenta et nervi sunt leges.

APHORISMUS 6.

Atque hunc finem optimæ leges assequuntur, plurimæ vero ipsarum aberrant. Leges enim mirum in modum, et maximo intervallo, inter se differunt; ut aliæ excellant; aliæ mediocriter se habeant; aliæ prorsus vitiosæ sint. Dictabimus igitur, pro judicii nostri modulo, quasdam tanquam *Legum Leges*, ex quibus informatio peti possit, quid in singulis legibus bene aut perperam positum aut constitutum sit.

APHORISMUS 7.

Antequam vero ad corpus ipsum legum particularium deveniamus, perstringemus paucis virtutes et dignitates legum in genere. Lex bona censeri possit, quæ sit *intimatione certa; præcepto justa; executione commoda; cum forma politiæ congrua;* et *generans virtutem in subditis.*

TITULUS I.

De Prima Dignitate Legum, ut sint Certæ.

APHORISMUS 8.

Legis tantum interest ut *certa* sit, ut absque hoc nec *justa* esse possit. *Si enim incertam vocem det tuba, quis se parabit ad bellum?*[1] Similiter, si incertam vocem det lex, quis se parabit ad parendum? Ut moneat igitur oportet, priusquam feriat. Etiam illud recte positum est; *optimam esse legem, quæ minimum relinquit arbitrio judicis*[2]: id quod *certitudo* ejus præstat.

[1] 1 Corinth. xiv. 8.

[2] Arist. Rhet. i. 1.

APHORISMUS 9.

Duplex legum Incertitudo: altera, ubi lex nulla præscribitur; altera, ubi ambigua et obscura. Itaque de Casibus Omissis a lege primo dicendum est; ut in his etiam inveniatur aliqua norma Certitudinis.

De Casibus Omissis a Lege.

APHORISMUS 10.

Angustia prudentiæ humanæ casus omnes quos tempus reperit non potest capere. Non raro itaque se ostendunt casus omissi et novi. In hujusmodi casibus triplex adhibetur remedium, sive supplementum; vel per *processum ad similia;* vel per *usum exemplorum, licet in legem non coäluerint;* vel per *jurisdictiones quæ statuunt ex arbitrio boni viri* et secundum discretionem sanam; sive illæ Curiæ fuerint Prætoriæ sive Censoriæ.

De Processu ad Similia, et Extensionibus Legum.

APHORISMUS 11.

In Casibus Omissis deducenda est norma legis a *similibus;* sed caute, et cum judicio. Circa quod servandæ sunt regulæ sequentes. Ratio prolifica, Consuetudo sterilis esto, nec generet casus. Itaque quod contra rationem juris receptum est, vel etiam ubi ratio ejus est obscura, non trahendum est ad consequentiam.[1]

APHORISMUS 12.

Bonum publicum insigne rapit ad se casus omissos. Quamobrem quando lex aliqua reipublicæ commoda notabiliter et majorem in modum intuetur et procurat, Interpretatio ejus extensiva esto et amplians.

APHORISMUS 13.

Durum est torquere leges, ad hoc ut torqueant homines. Non placet igitur extendi leges pœnales, multo minus capitales, ad delicta nova. Quod si crimen vetus fuerit et legibus notum; sed prosecutio ejus incidat in casum novum, a legibus non provisum; omnino recedatur a placitis juris potius quam delicta maneant impunita.

[1] "Quod contra rationem juris receptum est, non est producendum ad consequentia."— *Paulus, D.* 141., Ff. De Div. Reg. Jur. It may be remarked that, although the phrase "ad consequentias" is used as well as "ad consequentia," yet there seems to be no authority for "ad consequentiam."

APHORISMUS 14.

In statutis quæ Jus Commune (præsertim circa ea quæ frequenter incidunt, et diu coäluerunt) plane abrogant, non placet procedi per similitudinem ad casus omissos. Quando enim respublica tota lege diu caruerit, idque in casibus expressis, parum periculi est si casus omissi expectent remedium a statuto novo.

APHORISMUS 15.

Statuta quæ manifesto *Temporis Leges* fuere atque ex occasionibus reipublicæ tunc invalescentibus natæ, mutata ratione temporum, satis habent si se in propriis casibus sustinere possint; præposterum autem esset, si ad casus omissos ullo modo traherentur.

APHORISMUS 16.

Consequentiæ non est consequentia; sed sisti debet extensio intra casus proximos. Alioqui labetur paulatim ad dissimilia; et magis valebunt acumina ingeniorum, quam authoritates legum.

APHORISMUS 17.

In legibus et statutis brevioris stili, extensio facienda est liberius. At in illis quæ sunt enumerativa casuum particularium, cautius. Nam ut exceptio firmat vim legis in casibus non exceptis, ita enumeratio infirmat eam in casibus non enumeratis.

APHORISMUS 18.

Statutum Explanatorium claudit rivos statuti prioris, nec recipitur postea extensio in alterutro statuto. Neque enim facienda est *super-extensio* a judice, ubi semel cœpit fieri *extensio* a lege.

APHORISMUS 19.

Solennitas Verborum et Actorum non recipit extensionem ad similia. Perdit enim naturam solennis, quod transit a more ad arbitrium; et introductio novorum corrumpit majestatem veterum.

APHORISMUS 20.

Proclivis est extensio legis ad casus post-natos; qui in rerum natura non fuerunt tempore legis latæ. Ubi enim casus exprimi non poterat, quia tunc nullus erat, casus omissus habetur pro expresso, si similis fuerit ratio.

Atque de Extensionibus Legum in Casibus Omissis hæc dicta sint: nunc de usu Exemplorum dicendum.

De Exemplis, et usu eorum.[1]

APHORISMUS 21.

De Exemplis jam dicendum est, ex quibus Jus hauriendum sit, ubi Lex deficit. Atque de Consuetudine, quæ Legis species est, deque Exemplis quæ per frequentem usum in consuetudinem transierunt, tanquam Legem Tacitam, suo loco dicemus. Nunc autem de exemplis loquimur quæ raro et sparsim interveniunt, nec in legis vim coäluerunt; quando et qua cautione norma Juris ab ipsis petenda sit, cum Lex deficiat.

APHORISMUS 22.

Exempla a temporibus bonis et moderatis petenda sunt; non tyrannicis, aut factiosis, aut dissolutis. Hujusmodi exempla temporis partus spurii sunt, et magis nocent quam docent.

APHORISMUS 23.

In exemplis, recentiora habenda sunt pro tutioribus. Quod enim paulo ante factum est, unde nullum sit secutum incommodum, quidni iterum repetatur? Sed tamen minus habent authoritatis recentia; et si forte res in melius restitui opus sit, recentia exempla magis sæculum suum sapiunt quam rectam rationem.

APHORISMUS 24.

At vetustiora exempla caute, et cum delectu, recipienda. Decursus siquidem ætatis multa mutat; ut quod tempore videatur antiquum, id perturbatione et inconformitate ad præsentia sit plane novum. Medii itaque temporis exempla sunt optima, vel etiam talis temporis quod cum tempore currente plurimum conveniat; quod aliquando præstat tempus remotius magis quam in proximo.

[1] It is to be observed, that the principle on which the English courts have proceeded,—namely, that a decision on a point not previously decided on is to be accepted merely as a declaration of an already existing law virtually contained in the unwritten corpus juris entitled the Common Law, has had the effect of giving nearly equal weight to all cases decided by a competent tribunal. On the other hand, we find in the history of French jurisprudence that great uncertainty has existed as to the degree of authority to which a "res judicata" was entitled; the principle that "res judicata pro veritate accipitur" extending only to the parties between whom the actual decision was had. Thus it is related that De Thou was in the habit of saying, when it was mentioned that in a case similar to the one before him a decree had been given in favour of the plaintiff or defendant, "C'est bon pour lui;" implying that it was not of authority in any other case. The Parliament of Paris was for a long time in the habit of distinguishing the decisions to the principle of which it intended to give force of law from other decisions, by a more solemn form of delivering judgment; thereby in effect claiming what our courts have never claimed, namely, a power of making new law. A collection has been published of these quasi-legislative decisions, with the title of "Arrêts rendus en robe rouge." It is evident that the practice of the Parliament of Paris, which was probably followed by other of the French Parliaments, escapes from some of the inconveniences of the English theory.

APHORISMUS 25.

Intra fines exempli, vel citra potius, se cohibeto, nec illos ullo modo excedito. Ubi enim non adest Norma Legis, omnia quasi pro suspectis habenda sunt. Itaque, ut in obscuris, minimum sequitor.

APHORISMUS 26.

Cavendum ad exemplorum Fragmentis et Compendiis; atque integrum exemplum et universus ejus processus introspiciendus. Si enim incivile sit, nisi tota lege perspecta, de parte ejus judicare[1], multo magis hoc valere debet in exemplis; quæ ancipitis sunt usus, nisi valde quadrent.

APHORISMUS 27.

In exemplis plurimum interest, per quas manus transierint et transacta sint. Si enim apud scribas tantum et ministros justitiæ, ex cursu curiæ, absque notitia manifesta superiorum, obtinuerint; aut etiam apud errorum magistrum populum; conculcanda sunt et parvi facienda. Sin apud senatores aut judices aut curias principales ita sub oculis posita fuerint, ut necesse fuerit illa approbatione judicum, saltem tacita, munita fuisse, plus dignationis habent.

APHORISMUS 28.

Exemplis quæ publicata fuerint, utcunque minus fuerint in usu, cum tamen sermonibus et disceptationibus hominum agitata et ventilata extiterint, plus authoritatis tribuendum. Quæ vero in scriniis et archivis manserunt tanquam sepulta, et palam in oblivionem transierunt, minus. Exempla enim, sicut aquæ, in profluente sanissima.

APHORISMUS 29.

Exempla quæ ad leges spectant, non placet ab historicis peti; sed ab actis publicis et traditionibus diligentioribus. Versatur enim infœlicitas quædam inter historicos vel optimos, ut legibus et actis judicialibus non satis immorentur; aut si forte diligentiam quandam adhibuerint, tamen ab authenticis longe varient.

APHORISMUS 30.

Exemplum quod ætas contemporanea aut proxima respuit cum casus subinde recurreret, non facile admittendum est. Neque enim tantum pro illo facit quod homines illud quandoque usurparunt, quam contra, quod experti reliquerunt.

[1] "Incivile est, nisi totâ lege perspectâ, unâ aliquâ particulâ ejus propositâ judicare vel respondere."— *Celsus, D.* l. 3. 24.

APHORISMUS 31.

Exempla in consilium adhibentur, non utique jubent aut imperant. Igitur ita regantur, ut *authoritas* præteriti temporis flectatur ad *usum* præsentis.

Atque de Informatione ab Exemplis, ubi Lex deficit, hæc dicta sint. Jam dicendum de Curiis Prætoriis et Censoriis.

De Curiis Prætoriis et Censoriis.[1]

APHORISMUS 32.

Curiæ sunto et jurisdictiones, quæ statuant ex arbitrio boni viri et discretione sana, ubi legis norma deficit. Lex enim

[1] M. Bouillet remarks that every one who has commented on this tract of Bacon's has condemned the institution of these Courts. M. Dupin is evidently much perplexed by them. "Hic mera utopia proponitur" is the commencement of his note on the thirty-second aphorism. Doubtless it is odd that in inquiring how the law may be made certain Bacon should have introduced two Courts, of which the distinguishing character is the absence of any kind of certainty. But to every one who is acquainted with the history of English law, it is manifest that Bacon's intention was to give an idealised description of the Court of Star-Chamber, and of the equity jurisdiction of the Court of Chancery. Of the two institutions which he thus indirectly praises it is not necessary to say much. The Court of Star-Chamber, though of use in particular cases was unquestionably on the whole, an instrument of injustice and oppression; while, on the other hand, if equity had continued to be as indefinite as the jurisdiction of the "curiæ prætoriæ," it would soon have become a more intolerable evil than any which it could have been applied to relieve.

[The apparent inconsistency of introducing these discretionary tribunals into a scheme specially designed to make the operation of the law *certain*, admits, in my opinion, of a satisfactory explanation. The uncertainty of the law is injurious in two ways. On the one hand, it may lead me to expect that if I observe certain prescribed conditions, my liberty will not be interfered with; and when I think I have observed them, it may, by some arbitrary or unexpected interpretation, take me up and send me to prison. On the other hand, it may lead me to expect protection against particular kinds of injury, or (failing protection) redress; and, from some defect in its provisions, it may fail to prevent the injury or to afford the redress. The first kind of uncertainty resides in the interpretation, the second in the framing, of the law; and against *both* it is necessary, as far as may be, to provide. The *perfect* remedy is a code of laws so framed as to provide expressly for every possible case, coupled with a rule of interpretation which leaves no discretion whatever to the judge. But this is for Utopia. No lawgiver can perfectly foresee either the conditions of cases or the effect of words. Laws will therefore pass occasionally, which, if strictly construed, will punish the man whom they were intended to protect, and protect the man whom they were intended to punish. To correct such errors, a discretion must be allowed somewhere in the administration of the law; and the question is, where? According to Bacon's scheme, the necessary discretion is to be confided, not to the ordinary tribunals, but to others specially constituted for the purpose, and acting under restrictions and regulations specially framed to prevent them from abusing it; lest, in correcting one kind of uncertainty, uncertainties of another kind be introduced. What these restrictions and regulations should be, the rest of the section is occupied in explaining.

Now, to supply the defects of the law by the exercise of this kind of discretion was the proper function of the Star-Chamber and the Court of Chancery; and I see no occasion to seek further for Bacon's motive in introducing "an idealised description" of those Courts, — or, I should rather say, a description of two Courts constituted as, in a perfect administrative system, the Star-Chamber and the Court of Chancery ought to be.

With regard to the character of the actual Star-Chamber, we are not to forget that Bacon was not the only eminent jurist who approved of it. Sir Edward Coke, in the fourth book

(ut antea dictum est) non sufficit casibus; sed ad ea quæ plerunque accidunt aptatur. Sapientissima autem res Tempus[1] (ut ab antiquis dictum est), et novorum casuum quotidie author et inventor.

APHORISMUS 33.

Interveniunt autem novi casus, et in Criminalibus, qui pœna indigent; et in Civilibus, qui auxilio. Curias quæ ad priora illa respiciunt, *Censorias;* quæ ad posteriora, *Prætorias* appellamus.

APHORISMUS 34.

Habento Curiæ Censoriæ jurisdictionem et potestatem, non tantum nova delicta puniendi, sed etiam pœnas a legibus constitutas pro delictis veteribus augendi; si casus fuerint odiosi et enormes, modo non sint capitales. Enorme enim tanquam novum est.

APHORISMUS 35.

Habeant similiter Curæ Prætoriæ potestatem, tam subve-

of his *Institutes*, which was written in his old age, when he was regarded as the great champion of the people against the Crown, speaks of it in terms as favourable as ever Bacon did. "It is the most honourable Court" (he says)—"our parliament excepted—that is in the Christian world, both in respect of the Judges of the Court, and of their honourable proceeding according to their just jurisdiction, and the ancient and just orders of the Court." And I cannot help thinking that modern constitutional writers have judged of it too hastily from the accidental and exceptional circumstances which led to its abolition. It was an instrument of *government*. When the government was oppressive and unjust, it was an instrument of oppression and injustice. So, also, at many periods of our history have the Courts of Common Law been. But if we would know whether a Court constituted like the Star-Chamber had any necessary tendency to become an instrument of oppression, we must consider it in connexion with the rest of the constitution. Was it in any especial manner under the command of the Crown? Certainly not: it was under the command of the Crown so far only and so long only as the whole powers of government were under the command of the Crown. So far and so long as the King could appoint his own ministers and maintain them and carry on the government with them in spite of the House of Commons, so far and so long he could exercise an effectual control over the proceedings of a Court constituted like the Star-Chamber; no farther and no longer. The body of the Court was composed of the chief officers of the government; less than eight did not make a quorum; their proceedings were public; each member gave his own sentence with the reasons; the majority decided; the decree was solemnly recorded. As soon as the theory of a responsible ministry was recognised, and the impossibility of carrying on the government without money voted by the House of Commons gave the people an effective check upon the Crown, they would have had a check equally effective upon the proceedings of a court of justice so constituted. Any abuse of its authority would have led to a change of ministry, and to the transfer of that authority to other hands.

With regard to the Court of Chancery, it is less easy to say how it would have worked had its jurisdiction been exercised according to the conditions here prescribed for the Curiæ Prætoriæ; one of which is, that it was not to be confided to a single man. "Curiæ illæ" (i. e. Curiæ Censoriæ *et Prætoriæ*, see Aph. 36.) "uni viro ne committantur, sed ex pluribus constent." And in speculating upon the evil which it might have become with powers so indefinite, we must not forget how great an evil it has actually become in consequence of the rules by which its discretion has been defined and limited. The nearest approach to *certainty* attained by the existing system appears to be the certainty of damage to both parties.—*J. S.*]

[1] ὁ ἀληθέστατος λεγόμενος χρόνος εἶναι. —*Xenoph. Hellenic.* iii. 3. 2.

niendi contra *rigorem* Legis, quam supplendi *defectum* Legis. Si enim porrigi debet remedium ei quem lex præteriit; multo magis ei quem vulneravit.

APHORISMUS 36.

Curiæ istæ Censoriæ et Prætoriæ omnino intra casus enormes et extraordinarios se continento; nec jurisdictiones ordinarias invadunto; ne forte tendat res ad supplantationem legis, magis quam ad supplementum.

APHORISMUS 37.

Jurisdictiones istæ in Supremis tantum Curiis residento, nec ad Inferiores communicantor. Parum enim abest a potestate leges condendi, potestas eas supplendi aut extendendi aut moderandi.

APHORISMUS 38.

At Curiæ illæ uni viri ne committantur, sed ex pluribus constent. Nec decreta exeant cum silentio; sed judices sententiæ suæ rationes adducant, idque palam atque astante corona; ut quod ipsa potestate sit liberum, fama tamen et existimatione sit circumscriptum.

APHORISMUS 39.

Rubricæ Sanguinis ne sunto; nec de capitalibus, in quibuscunque curiis, nisi ex lege nota et certa pronunciato. Indixit enim mortem Deus ipse prius; postea inflixit. Nec vita eripienda nisi ei qui se in suam vitam peccare prius nosset.

APHORISMUS 40.

In Curiis Censoriis calculum tertium dato; ut judicibus non imponatur necessitas aut absolvendi aut condemnandi; sed etiam ut *non liquere* pronunciare possint. Etiam censoria non tantum *pœna*, sed et *nota* esto; scilicet quæ non infligat supplicium, sed aut in admonitionem desinat, aut reos ignominia levi et tanquam rubore castiget.

APHORISMUS 41.

In Curiis Censoriis, omnium magnorum criminum et scelerum actus *inchoati* et *medii* puniuntor; licet non sequatur effectus consummatus [1]; isque sit earum curiarum usus vel maximus; cum et severitatis intersit, initia scelerum puniri; et clementiæ, perpetrationem eorum (puniendo actus medios) intercipi.

[1] Of the Star-Chamber, Bacon has said, in his *History of Henry VII.*, that it took cognisance of "forces, frauds, crimes various of stellionate, and the inchoations or middle acts towards crimes capital or heinous, not actually committed or perpetrated."

APHORISMUS 42.

Cavendum inprimis, ne in Curiis Prætoriis præbeatur auxilium in casibus quos lex non tam omisit, quam pro levibus contempsit, aut pro odiosis remedio indignos judicavit.

APHORISMUS 43.

Maxime omnium interest Certitudinis Legum (de qua nunc agimus), ne Curiæ Prætoriæ intumescant et exundent in tantum, ut prætextu rigoris legum mitigandi, etiam robur et nervos iis incidant aut laxent; omnia trahendo ad arbitrium.

APHORISMUS 44.

Decernendi contra Statutum Expressum, sub ullo æquitatis prætextu, Curiis Prætoriis jus ne esto. Hoc enim si fieret, Judex prorsus transiret in Legislatorem, atque omnia ex arbitrio penderent.

APHORISMUS 45.

Apud nonnullos receptum est, ut jurisdictio quæ decernit secundum æquum et bonum, atque illa altera quæ procedit secundum jus strictum, iisdam curiis deputentur; apud alios autem, ut diversis. Omnino placet curiarum separatio. Neque enim servabitur distinctio casuum, si fiat commixtio jurisdictionum; sed Arbitrium Legem tandem trahet.

APHORISMUS 46.

Non sine causa in usum venerat apud Romanos *Album Prætoris*, in quo præscripsit et publicavit quomodo ipse jus dicturus esset.[1] Quo exemplo, judices in Curiis Prætoriis regulas sibi certas (quantum fieri potest) proponere easque publice affigere debent. Etenim optima est lex, quæ minimum relinquit arbitrio judicis; optimus judex, qui minimum sibi.

Verum de Curiis istis fusius tractabimus, cum ad locum de Judiciis veniemus; obiter tantum jam locuti de iis, quatenus expediant et suppleant Omissa a Lege.

De Retrospectione Legum.

APHORISMUS 47.

Est et aliud genus Supplementi Casuum Omissorum, cum lex legem supervenit, atque simul casus omissos trahit. Id fit in

[1] "Album prætoris est quædam tabula dealbata posita pro rostris, in quâ proponebantur edicta prætoris, ut facile ex eminenti conspicerentur et legerentur."—*Vetus Gloss. à Brissonio laudat.* In the ordinary use of the word it signifies a collection of the formulæ by means of which actions were carried on, thus corresponding to the register of writs in our municipal law. The edict contained a good deal more than a mere collection of formulæ, though these probably constituted a portion of it.

legibus sive statutis quæ *retrospiciunt*, ut vulgo loquuntur; cujus generis leges raro et magna cum cautione sunt adhibendæ. Neque enim placet Janus in Legibus.

APHORISMUS 48.

Qui verba aut sententiam legis captione et fraude eludit et circumscribit, dignus est qui etiam a lege sequente innodetur. Igitur in casibus fraudis et evasionis dolosæ, justum est ut leges retrospiciant, atque alteræ alteris in subsidiis sint; ut qui dolos meditatur et eversionem legum præsentium, saltem a futuris metuat.

APHORISMUS 49.

Leges quæ actorum et instrumentorum veras intentiones contra formularum aut solennitatum defectus roborant et confirmant, rectissime præterita complectuntur. Legis enim quæ *retrospicit*, vitium vel præcipuum est quod *perturbet*. At hujusmodi leges confirmatoriæ ad pacem et stabilimentum eorum quæ transacta sunt spectant. Cavendum tamen est, ne convellantur res judicatæ.

APHORISMUS 50.

Diligenter attendendum, ne eæ leges tantum ad præterita respicere putentur, quæ ante-acta infirmant; sed et eæ quæ futura prohibent et restringunt, cum præteritis necessario connexa. Veluti, si quæ lex artificibus aliquibus interdicat, ne mercimonia sua in posterum vendant; hæc sonat in posterum, sed operatur in præteritum; neque enim illis alia ratione victum quærere jam integrum est.

APHORISMUS 51.

Lex Declaratoria omnis, licet non habet verba de præterito, tamen ad præterita, ipsa vi declarationis, omnino trahitur. Non enim tum incipit interpretatio cum declaratur, sed efficitur tanquam contemporanea ipsi legi. Itaque Leges Declaratorias ne ordinato, nisi in casibus ubi leges cum justitia *retrospicere* possint.

Hic vero eam partem absolvimus, quæ tractat de Incertitudine Legum ubi invenitur lex nulla. Jam dicendum est de altera illa parte, ubi scilicet lex extat aliqua, sed perplexa et obscura.

De Obscuritate Legum.

APHORISMUS 52.

Obscuritas Legum a quatuor rebus originem ducit; vel ab

accumulatione legum nimia, præsertim admixtis obsoletis; vel a *descriptione earum ambigua* aut minus perspicua et dilucida; vel a *modis enucleandi juris neglectis* aut non bene institutis; vel denique a *contradictione et vacillatione judiciorum*.

De Accumulatione Legum nimia.

APHORISMUS 53.

Dicit Propheta; *Pluet super eos laqueos.*[1] Non sunt autem pejores laquei quam laquei legum, præsertim pœnalium; si numero immensæ, et temporis decursu inutiles, non lucernam pedibus præbeant, sed retia potius objiciant.

APHORISMUS 54.

Duplex in usum venit Statuti Novi condendi ratio. Altera statuta priora circa idem subjectum confirmat et roborat; dein nonnulla addit aut mutat. Altera abrogat et delet cuncta quæ ante ordinata sunt, et de integro legem novam et uniformem substituit. Placet posterior ratio. Nam ex priore ratione ordinationes deveniunt complicatæ et perplexæ; et quod instat agitur sane, sed Corpus Legum interim redditur vitiosum. In posteriore autem, major certe est adhibenda diligentia, dum de lege ipsa deliberatur; et anteacta scilicet evolvenda et pensitanda antequam lex feratur; sed optime procedit per hoc legum concordia in futurum.

APHORISMUS 55.

Erat in more apud Athenienses, ut contraria legum capita (quæ *Anti-Nomias* vocant) quotannis a sex viris examinarentur; et quæ reconciliari non poterant proponerentur populo, ut de illis certum aliquid statueretur.[2] Ad quorum exemplum, ii qui potestatem in singulis politiis legum condendarum habent, per triennium, aut quinquennium, aut prout videbitur, Anti-Nomias retractanto. Eæ autem a viris ad hoc delegatis prius inspiciantur et præparentur, et demum Comitiis exhibeantur; ut quod placuerit, per suffragia stabiliatur et figatur.

APHORISMUS 56.

Neque vero contraria legum capita reconciliandi, et omnia (ut loquuntur) *salvandi*, per distinctiones subtiles et quæsitas, nimis

[1] Psalm xi. 6.

[2] The sex viri here mentioned are the θεσμοθέται. See *Schöman, De Com. Athen.* p. 259. The word Antinomia is used in the sense of a contradiction between different laws by Justinian. In Plutarch (*Symposiaca*, ix. 13.) it is nearly equivalent to what Jurisconsults designate by the phrase "casus perplexus."

sedula aut anxia cura esto. Ingenii enim hæc tela est; atque utcunque modestiam quandam et reverentiam præ se ferat, inter noxia tamen censenda est; utpote quæ reddat corpus universum legum varium, et male consutum. Melius est prorsus ut succumbant deteriora, et meliora stent sola.

APHORISMUS 57.

Obsoletæ Leges et quæ abierunt in desuetudinem, non minus quam Anti-Nomiæ, proponantur a delegatis ex officio tollendæ. Cum enim Statutum Expressum regulariter desuetudine non abrogetur, fit ut ex contemptu legum obsoletarum fiat nonnulla authoritatis jactura etiam in reliquis; et sequitur tormenti illud genus Mezentii, ut *leges vivæ in complexu mortuarum perimantur.* Atque omnino cavendum est a gangræna in legibus.

APHORISMUS 58.

Quin et in legibus et statutis obsoletis, nec noviter promulgatis, Curiis Prætoriis interim contra eas decernendi jus esto. Licet enim non male dictum sit, *neminem oportere legibus esse sapientiorem*[1], tamen intelligatur hoc de legibus cum evigilent, non cum dormitent. Contra recentiora vero statuta (quæ juri publico nocere deprehenduntur) non utique Prætoribus, sed Regibus, et Sanctioribus Consiliis, et Supremis Potestatibus, auxilium præbendi jus esto; earum executionem per edicta aut acta suspendendo, donec redeant Comitia, aut hujusmodi cœtus qui potestatem habeant eas abrogandi; ne salus populi interim periclitetur.[2]

[1] Bacon refers perhaps to D'Argentré's maxim, "Stulta videtur sapientia quæ lege vult sapientior videri." In the passage from which these words are taken, he is condemning the presumption of judges who depart from the text on the pretence of equity. D'Argentré died in 1590.

Compare Aristotle, Rhet. i. 15. 12.: Καὶ ὅτι τὸ τῶν νόμων σοφώτερον ζητεῖν εἶναι, τοῦτ' ἔστιν ὃ ἐν τοῖς ἐπαινουμένοις νόμοις ἀπαγορεύεται. See also Cleon's speech, *Thucyd.* iii. 37. The "obliqua oratio," in the passage quoted from Aristotle arises from the way in which the remark is introduced: namely, as what might be said by a pleader to whom the letter of the law is favourable.

[2] Here, as in the description of the Curiæ Censoriæ and Prætoriæ, reference is made to what actually existed in England in Bacon's time. In the concluding part of this aphorism he sanctions the doctrine that an act of Parliament may provisionally at least be suspended or set aside by an Order in Council. This doctrine was undoubtedly commonly maintained in Bacon's time, but it was nevertheless even then protested against.

[When the rights of the people were not sufficiently secured against the powers of the Crown, and therefore to weaken those powers was a patriotic object, such doctrines were naturally protested against. For when the Crown could successfully and safely abuse the powers it had, the evil could only be remedied or mitigated by taking them away. And it was doubtless by restricting its authority in matters like this that the people were in fact enabled to win the game, and exact sufficient securities for

De novis Digestis Legum.[1]

APHORISMUS 59.

Quod si Leges aliæ super alias accumulatæ in tam vasta excreverint volumina, aut tanta confusione laboraverint, ut eas de integro retractare et in corpus sanum et habile redigere ex usu sit; id ante omnia agito; atque opus ejusmodi opus heroïcum esto; atque authores talis operis inter legislatores et instauratores rite et merito numerantor.

APHORISMUS 60.

Hujusmodi Legum Expurgatio, et Digestum Novum, quinque rebus absolvitur. Primo, omittantur obsoleta, quæ Justinianus *antiquas fabulas* vocat.[2] Deinde, ex Anti-Nomiis recipiantur probatissimæ, aboleantur contrariæ. Tertio, Homoio-Nomiæ, sive leges quæ idem sonant atque nil aliud sunt quam iterationes ejusdem rei, expungantur; atque una quæpiam ex iis, quæ maxime est perfecta, retineatur vice omnium. Quarto, si quæ legum nihil determinent, sed quæstiones tantum proponant, easque relinquant indecisas, similiter facessant. Postremo, quæ verbosæ inveniuntur et nimis prolixæ, contrahantur magis in arctum.

APHORISMUS 61.

Omnino vero ex usu fuerit in Novo Digesto Legum, leges pro Jure Communi receptas, quæ tanquam immemoriales sunt in origine sua, atque ex altera parte statuta de tempore in tempus superaddita, seorsum digerere et componere; cum in plurimis rebus non eadem sit, in jure dicendo, Juris Communis et Statutorum interpretatio et administratio. Id quod fecit Trebonianus in Digesto et Codice.[3]

themselves. But we must remember that throughout this treatise Bacon assumes the existence of a government otherwise well constituted. And I am much inclined to think that these securities being once attained, and the House of Commons having in fact a veto upon all the proceedings of the Crown, such an authority might be intrusted to the government both safely and beneficially. Bacon was not considering what powers could be exercised *constitutionally*, i. e. according to law and precedent, by the *English* government, but generally what powers it was good for a people that the governing authority should have. — *J. S.*]

[1] This section, and especially the 64th Aphorism, is spoken of with great commendation by perhaps the highest authority on such subjects. See Savigny "On the Vocation of our Time to Legislation," 3d edition, p. 20.

[2] Institut. Proœm. § 3. The great bulk of Justinian's *Institutiones* are merely a reproduction of those of Gaius.

[3] The Digest consists of Excerpta from the works of a great number of jurists, so arranged as to form a connected view of the whole of the Roman law. The Codex is a collection of imperial ordinances most of which relate to particular cases, but are nevertheless of general authority, while others are in form as well as in effect legislative enactments.

The Digest cannot be regarded as a Corpus of customary law: we find in every

APHORISMUS 62.

Verum in hujusmodi Legum Regeneratione atque structura nova, veterum legum atque librorum legis verba prorsus et textum retineto; licet per centones et portiones exiguas eas excerpere necesse fuerit: Ea deinde ordine contexito. Etsi enim fortasse commodius atque etiam, si ad rectam rationem respicias, melius hoc transigi posset per textum novum quam per hujusmodi consarcinationem; tamen in legibus, non tam stilus et descriptio, quam Authoritas, et hujus patronus Antiquitas, spectanda est. Alias videri possit hujusmodi opus scholasticum potius quiddam et methodus, quam Corpus Legum Imperantium.

APHORISMUS 63.

Consultum fuerit in Novo Digesto Legum vetera volumina non prorsus deleri et in oblivionem cedere, sed in bibliothecis saltem manere; licet usus eorum vulgaris et promiscuus prohibeatur. Etenim in causis gravioribus, non abs re fuerit legum præteritarum mutationes et series consulere et inspicere; ac certe sollenne est antiquitatem præsentibus aspergere. Novum autem hujusmodi Corpus Legum ab iis qui in politiis singulis habent potestatem legislatoriam prorsus confirmandum est; ne forte, prætextu veteres leges digerendi, leges novæ imponantur occulto.

APHORISMUS 64.

Optandum esset ut hujusmodi Legum Instauratio illis temporibus suscipiatur, quæ antiquioribus, quorum acta et opera retractant, literis et rerum cognitione præstiterint. Quod secus in opere Justiniani evenit. Infœlix res namque est, cum ex judicio et delectu ætatis minus prudentis et eruditæ antiquorum opera mutilentur et recomponantur. Veruntamen sæpe necessarium est, quod non optimum.

Atque de Legum Obscuritate, quæ a nimia et confusa earum

portion of it continual references to every source of law,—to leges, plebiscita, edicta, senatûs consulta, and imperial rescripts and constitutions, as well as to jus civile, in the narrow sense in which the phrase is equivalent to immemorial custom. It is scarcely necessary to mention that Tribonianus was Justinian's chief instrument in the compilation of the *Digest*, *Codex*, and the *Institutes*. The first of these three works is the greatest in extent and importance. It was drawn up by a commission of seventeen persons, of which Tribonianus was the head, as he was likewise of the smaller commissions by which the other two were compiled. By the *Codex* I mean the *Codex Repetitæ Prælectionis:* Tribonianus was not at the head of the commission by which the original *Codex* was drawn up, and it has been conjectured that his dissatisfaction at this circumstance occasioned the revision.

accumulatione fit, hæc dicta sint. Jam de Descriptione earum Ambigua et Obscura dicendum.

De Descriptione Legum Perplexa et Obscura.

APHORISMUS 65.

Descriptio Legum obscura oritur, aut ex loquacitate et verbositate earum; aut rursus ex brevitate nimia; aut ex prologo legis cum ipso corpore legis pugnante.

APHORISMUS 66.

De obscuritate vero legum quæ ex earum descriptione prava oritur, jam dicendum est. Loquacitas quæ in perscribendo leges in usum venit, et prolixitas, non placet. Neque enim quod vult et captat ullo modo assequitur, sed contrarium potius. Cum enim casus singulos particulares verbis appositis et propriis persequi et exprimere contendat, majorem inde sperans certitudinem; e contra quæstiones multiplices parit de verbis; ut difficilius procedat interpretatio secundum sententiam legis (quæ sanior est et verior) propter strepitum verborum.

APHORISMUS 67.

Neque propterea nimis concisa et affectata brevitas, majestatis gratia, et tanquam magis imperatoria, probanda est; præsertim his sæculis, ne forte sit lex instar *Regulæ Lesbiæ.*[1] Mediocritas ergo assectanda est; et verborum exquirenda generalitas, bene terminata; quæ licet casus comprehensos non sedulo persequatur, attamen non comprehensos satis perspicue excludat.

APHORISMUS 68.

In legibus tamen atque edictis ordinariis et politicis, in quibus ut plurimum nemo jurisconsultum adhibet, sed suo sensui confidit, omnia fusius explicari debent, et ad captum vulgi tanquam digito monstrari.

APHORISMUS 69.

Neque nobis prologi legum, qui inepti olim habiti sunt, et

[1] "Lesbia regula dicitur quoties præpostere, non ad rationem factum, sed ratio ad factum accommodatur."—*Erasm. Adag.* i. 93.

Bacon's meaning is, that if the law be too concisely stated it may be bent by the interpretations which its excessive brevity will render necessary, so as to operate in a way which the legislator did not contemplate. This will more clearly appear to be his meaning from the following passage from the *Nicomachean Ethics*, v. c. 10, to which Erasmus refers: τοῦ γὰρ ἀορίστου ἀορίστος καὶ ὁ κανὼν ἐστιν, ὥσπερ καὶ τῆς Λεσβίας οἰκοδομῆς ὁ μολύβδινος κανών. In building with irregularly shaped stones, flexible rules might be found of use, and it would appear that the Lesbians were in the habit of employing them.

leges introducunt disputantes non jubentes, utique placerent, si priscos mores ferre possemus.[1] Sed prologi isti legum plerunque (ut nunc sunt tempora) necessario adhibentur, non tam ad explicationem legis, quam instar suasionis ad perferendam legem in Comitiis; et rursus ad satisfaciendum populo. Quantum fieri potest tamen, prologi evitentur, et lex incipiat a jussione.

APHORISMUS 70.

Intentio et sententia legis, licet ex præfationibus et præambulis (ut loquuntur) non male quandoque eliciatur, attamen latitudo aut extensio ejus ex illis minime peti debet. Sæpe enim præambulum arripit nonnulla ex maxime plausibilibus et speciosis ad exemplum, cum lex tamen multo plura complectatur; aut contra, lex restringit et limitat complura, cujus limitationis rationem in præambulo inseri non fuerit opus. Quare dimensio et latitudo legis ex corpore legis petenda. Nam præambulum sæpe aut ultra aut citra cadit.

APHORISMUS 71.

Est vero genus perscribendi leges valde vitiosum. Cum scilicet casus ad quem lex collimat fuse exprimitur in præambulo; deinde ex vi verbi (*talis*) aut hujusmodi relativi corpus legis retro vertitur in præambulum, unde præambulum inseritur et incorporatur ipsi legi; quod et obscurum est et minus tutum, quia non eadem adhiberi consuevit diligentia in ponderandis et examinandis verbis præambuli, quæ adhibetur in corpore ipsius legis.

Hanc partem, de Incertitudine legum quæ ex mala descriptione ipsarum ortum habet, fusius tractabimus, quando de Interpretatione legum postea agemus. Atque de Descriptione legum Obscura hæc dicta sint; jam de Modis Enucleandi Juris dicendum.

De Modis Enucleandi Juris, et Tollendi Ambigua.

APHORISMUS 72.

Modi Enucleandi Juris et Tollendi Dubia, quinque sunt. Hoc enim fit aut per *Perscriptiones Judiciorum;* aut per *Scriptores Authenticos;* aut per *Libros Auxiliares;* aut per *Prælectiones;* aut per *Responsa sive Consulta Prudentum.* Hæc

[1] "Jubeat," says Seneca, speaking of law, "non disputet. Nihil videtur mihi ineptius quam lex cum prologo."—*Ep.* 95.

omnia, si bene instituantur, præsto erunt magna legum obscuritati subsidia.

De Perscriptione Judiciorum.

APHORISMUS 73.

Ante omnia, judicia reddita in curiis supremis et principalibus atque causis gravioribus, præsertim dubiis, quæque aliquid habent difficultatis aut novitatis, diligenter et cum fide excipiunto. Judicia enim anchoræ legum sunt, ut leges reipublicæ.

APHORISMUS 74.

Modus hujusmodi judicia excipiendi et in scripta referendi, talis esto. Casus præcise, judicia ipsa exacte, perscribito; rationes judiciorum, quas adduxerunt judices, adjicito; casuum ad exemplum adductorum authoritatem cum casibus principalibus ne commisceto; de advocatorum perorationibus, nisi quidpiam in iis fuerit admodum eximium, sileto.

APHORISMUS 75.

Personæ quæ hujusmodi judicia excipiant, ex advocatis maxime doctis sunto, et honorarium liberale ex publico excipiunto. Judices ipsi ab hujusmodi perscriptionibus abstinento; ne forte opinionibus propriis addicti, et authoritate propria freti, limites referendarii transcendant.

APHORISMUS 76.

Judicia illa in ordine et serie temporis digerito, non per methodum et titulos. Sunt enim scripta ejusmodi tanquam historiæ aut narrationes legum. Neque solum acta ipsa, sed et tempora ipsorum, judici prudenti lucem præbent.

De Scriptoribus Authenticis.

APHORISMUS 77.

Ex legibus ipsis, quæ Jus Commune constituunt; deinde ex constitutionibus sive statutis; tertio loco ex judiciis perscriptis, Corpus Juris tantummodo constituitor. Præter illa, alia authentica aut nulla sunto, aut parce recipiuntor.

APHORISMUS 78.

Nihil tam interest Certitudinis Legum (de qua nunc tractamus) quam ut scripta authentica intra fines moderatos coërceantur, et facessat multitudo enormis authorum et doctorum in jure; unde laceratur sententia legum, judex fit attonitus, processus immortales, atque advocatus ipse, cum tot libros per-

legere et vincere non possit, compendia sectatur. Glossa fortasse aliqua bona, et ex scriptoribus classicis pauci, vel potius scriptorum paucorum pauculæ portiones, recipi possint pro authenticis. Reliquorum nihilominus maneat usus nonnullus in bibliothecis, ut eorum tractatus inspiciant judices aut advocati, cum opus fuerit; sed in causis agendis, in foro citare eos non permittitor, nec in authoritatem transeunto.

De Libris Auxiliaribus.

APHORISMUS 79.

At Scientiam Juris et Practicam auxiliaribus libris ne nudanto, sed potius instruunto.[1] Ii sex in genere sunto. Institutiones. De Verborum Significatione. De Regulis Juris.[2] Antiquitates Legum. Summæ. Agendi Formulæ.

APHORISMUS 80.

Præparandi sunt juvenes et novitii ad scientiam et ardua juris altius et commodius haurienda et imbibenda, per Institutiones. Institutiones illas ordine claro et perspicuo componito. In illis ipsis universum Jus Privatum percurrito; non alia omittendo, in aliis plus satis immorando, sed ex singulis quædam breviter delibando, ut ad Corpus Legum perlegendum accessuro nil se ostendat prorsus novum, sed levi aliqua notione præceptum. Jus Publicum in Institutionibus ne attingito, verum illud ex fontibus ipsis hauriatur.

APHORISMUS 81.

Commentarium de Vocabulis Juris conficito. In explicatione ipsorum, et sensu reddendo, ne curiose nimis aut laboriose versator. Neque enim hoc agitur, ut diffinitiones verborum quærantur exacte, sed explicationes tantum quæ legendis juris libris viam aperiant faciliorem. Tractatum autem istum per literas alphabeti ne digerito; id indici alicui relinquito; sed collocentur simul verba quæ circa eandem rem versantur, ut alterum alteri sit juvamento ad intelligendum.

APHORISMUS 82.

Ad Certitudinem Legum facit (si quid aliud) tractatus bonus et diligens de Diversis Regulis Juris. Is dignus est, qui maximis ingeniis et prudentissimis jure-consultis committatur. Neque enim placent quæ in hoc genere extant. Colligendæ

[1] So in the original edition: q. *nudato* .... *instruito.*—*J. S.*

[2] "De verborum significatione" and "De diversis regulis antiqui juris," are respectively the penultimate and the last Tituli in the *Digest.*

autem sunt regulæ, non tantum notæ et vulgatæ, sed et aliæ magis subtiles et reconditæ, quæ ex legum et rerum judicatarum harmonia extrahi possint; quales in rubricis optimis quandoque inveniuntur; suntque dictamina generalia rationis, quæ per materias legis diversas percurrunt, et sunt tanquam *Saburra Juris.*

APHORISMUS 83.

At singula Juris Scita aut Placita non intelligantur pro Regulis, ut fieri solet satis imperite. Hoc enim si reciperetur, quot Leges tot Regulæ; Lex enim nil aliud quam Regula Imperans. Verum eas pro Regulis habeto, quæ in forma ipsa justitiæ hærent: unde, ut plurimum, per Jura Civilia diversarum rerumpublicarum eædem Regulæ fere reperiuntur; nisi forte propter relationem ad formas politiarum varient.

APHORISMUS 84.

Post Regulam brevi et solido verborum complexu enuntiatam, adjiciantur Exempla, et Decisiones Casuum maxime luculentæ, ad Explicationem; Distinctiones et Exceptiones, ad Limitationem; Cognata, ad Ampliationem ejusdem Regulæ.

APHORISMUS 85.

Recte jubetur, ut non ex Regulis Jus sumatur; sed ex Jure quod est, Regula fiat.[1] Neque enim ex Verbis Regulæ petenda est probatio, ac si esset Textus Legis. Regula enim Legem (ut acus nautica polos) indicat, non statuit.

APHORISMUS 86.

Præter Corpus ipsum Juris, juvabit etiam Antiquitates Legum invisere; quibus licet evanuerit authoritas, manet tamen reverentia. Pro antiquitatibus autem legum habeantur scripta circa leges et judicia, sive illa fuerint edita sive non, quæ ipsum Corpus Legum tempore præcesserunt. Earum siquidem jactura facienda non est. Itaque ex iis utilissima quæque excerpito (multa enim invenientur inania et frivola), eaque in unum volumen redigito; ne *antiquæ fabulæ*, ut loquitur Trebonianus, cum Legibus ipsis misceantur.

APHORISMUS 87.

Practicæ vero plurimum interest, ut jus universum digeratur ordine in Locos et Titulos; ad quos subito (prout dabitur occasio) recurrere quis possit, veluti in promptuarium paratum ad præsentes usus. Hujusmodi Libri Summarum et ordinant

[1] "Non ex regulâ jus sumatur; sed ex jure quod est, regula fiat." — *Paulus, D.* § De diversis regulis antiqui juris, l. 1.

sparsa, et abbreviant fusa et prolixa in lege. Cavendum autem est, ne summæ istæ reddant homines promptos ad practicam, cessatores in scientia ipsa. Earum enim officium est tale, ut ex iis recolatur jus, non perdiscatur. Summæ autem omnino magna diligentia, fide, et judicio sunt conficienda, ne furtum faciant legibus.

APHORISMUS 88.

Formulas Agendi diversas in unoquoque genere colligito. Nam et practicæ hoc interest; et certe pandunt illæ oracula et occulta legum. Sunt enim non pauca quæ latent in legibus, at in formulis agendi melius et fusius perspiciuntur; instar pugni et palmæ.

De Responsis et Consultis.

APHORISMUS 89.

Dubitationes Particulares quæ de tempore in tempus emergunt dirimendi et solvendi, aliqua ratio iniri debet. Durum enim est ut ii qui ab errore cavere cupiant ducem viæ non inveniant, verum ut actus ipsi periclitentur, neque sit aliquis ante rem peractam juris prænoscendi modus.

APHORISMUS 90.

Responsa Prudentum, quæ petentibus dantur de jure sive ab advocatis sive a doctoribus, tanta valere authoritate ut ab eorum sententia judici recedere non sit licitum, non placet.[1] Jura a Juratis Judicibus sumunto.

APHORISMUS 91.

Tentari judicia per causas et personas fictas, ut eo modo experiantur homines qualis futura sit legis norma, non placet.[2]

[1] By the Roman Jurists the Responsa prudentium are reckoned among the Fontes Juris, but there are few points in the history of Roman law on which it is more difficult to form a satisfactory opinion. We have no satisfactory information either as to the form in which these Responsa were given, or as to the degree of authority with which they were invested. The common opinion is, that they received absolute force of law in virtue of an ordinance of Augustus, and that more precise regulations with respect to cases in which a diversity of opinion existed were made by Hadrian. The connexion between them and the law of citations of Honorius and Valentinian is also a matter of much obscurity. See Böcking's *Pandekten*, i. p. 36. Walter, *Gesch. d. R. Rechts*, § 409. and 421. Hugo, *Gesch. d. R. Rechts*, § 313. and 385.

[2] Lord Ellenborough refused to try a case in which a bet had been made on a point of law. He asked, it is said, to see the record, and threw it down "with much indignation." Tradition adds that he threw it at the head of the plaintiff's attorney. Until lately, when it was found necessary in proceedings in equity to have the decision of a jury on a question of fact, recourse was had to the machinery of a feigned issue; that is, an action was brought on an imaginary wager as to the truth or falsehood of an agreed upon statement of facts. Possibly in Bacon's time a similar course may have been adopted in order to obtain the opinion of the judges on points of law. In

Dedecorat enim majestatem legum, et pro prævaricatione quapiam censenda est. Judicia autem aliquid habere ex scena deforme est.

APHORISMUS 92.

Judicum igitur solummodo, tam Judicia quam Responsa et Consulta sunto. Illa de litibus pendentibus, hæc de arduis juris quæstionibus in thesi. Ea Consulta, sive in privatis rebus sive in publicis, a Judicibus ipsis ne poscito (id enim si fiat, judex transeat in advocatum); sed a Principe, aut Statu. Ab illis ad Judices demandentur. Judices vero, tali authoritate freti, disceptationes advocatorum, vel ab his quorum interest adhibitorum, vel a Judicibus ipsis (si opus sit) assignatorum, et argumenta ex utraque parte audiunto; et, re deliberata, jus expediunto et declaranto. Consulta hujusmodi inter Judicia referunto et edunto, et paris authoritatis sunto.[1]

De Prælectionibus.

APHORISMUS 93.

Prælectiones de Jure, atque Exercitationes eorum qui juris studiis incumbunt et operam dant, ita instituuntor et ordinantor, ut omnia tendant ad quæstiones et controversias de jure sedandas potius quam excitandas. Ludus enim (ut nunc fit) fere apud omnes instituitur et aperitur ad altercationes et quæstiones de jure multiplicandas, tanquam ostentandi ingenii causa. Atque hoc vetus est malum. Etenim etiam apud antiquos

modern times the practice has been in accordance with what he a little further on recommends; the point of law being referred to the judges directly, who, after hearing counsel, certify their opinion of it to the Chancellor.

[1] Bacon refers to the practice of extra-judicial consultations as it existed in his own time. It does not, I believe, appear that it was ever the practice for private persons to obtain through the intervention of the Privy Council authoritative decisions on legal questions, but it is well known that the Court occasionally obtained "præjudicia" from the judges on points in which it was itself interested. The effect of this practice in promoting judicial servility is well seen in the case of ship-money; the extra-judicial decision of the judges in favour of its legality being unanimous, whereas when the case came on in the exchequer chamber, it was affirmed to be legal by a bare majority of seven against five.

[I cannot think that Bacon alludes to extra-judicial consultations of this kind; which were conducted in a different way from those he recommends, and resorted to for a different purpose. The object of the Government in asking the judges' opinions on the case privately before commencing a prosecution, was to ascertain that the case was a good one, and so avoid the scandal and disrepute which then attended the failure of a Crown prosecution. The object of the proceeding which Bacon here advocates, is to provide a means of settling any disputed point of law, without either waiting for a real cause in which it may be involved, or getting up a fictitious one; and the manner of it is to be public and formal. The case is to be regularly argued and the judgment formally recorded. — *J. S.*]

gloriæ fuit, tanquam per sectas et factiones, quæstiones complures de jure magis fovere quam extinguere.[1] Id ne fiat provideto.

De Vacillatione Judiciorum.

APHORISMUS 94.

Vacillant Judicia, vel propter immaturam et præfestinam sententiam; vel propter æmulationem curiarum; vel propter malam et imperitam perscriptionem judiciorum; vel propter viam præbitam ad rescissionem eorum nimis facilem et expeditam. Itaque providendum est ut judicia emanent, matura deliberatione prius habita; atque ut curiæ se invicem revereantur, atque ut judicia perscribantur fideliter et prudenter; utque via ad rescindenda judicia sit arcta, confragosa, et tanquam muricibus strata.

APHORISMUS 95.

Si judicium redditum fuerit de casu aliquo in aliqua curia principali, et similis casus intervenerit in alia curia, ne procedito ad judicium antequam fiat consultatio in collegio aliquo judicum majore. Judicia enim reddita, si forte rescindi necesse sit, saltem sepeliuntor cum honore.

APHORISMUS 96.

Ut curiæ de jurisdictione digladientur et conflictentur, humanum quiddam est; eoque magis, quod per ineptam quandam sententiam (*quod boni et strenui sit judicis, ampliare jurisdictionem Curiæ*) alatur plane ista intemperies, et calcar addatur ubi fræno opus est. Ut vero ex hac animorum contentione curiæ judicia utrobique reddita (quæ nil ad jurisdictionem pertinent) libenter rescindant, intolerabile malum; et a regibus, aut senatu, aut politia plane vindicandum. Pessimi enim exempli res est, ut curiæ, quæ pacem subditis præstant, inter se duella exerceant.

[1] Our knowledge of the history of the two sects or schools of jurists which existed during what is called the middle period of Roman jurisprudence is still imperfect, though less so than before the discovery of the Institutes of Gaius. It appears probable that the importance of the differences of opinion between them has been exaggerated, and that the sects themselves had died out before the time of Justinian, The two schools respectively regarded Ateius Capito and Anstitius Labeo as their head or founder; but the followers of the former were called Sabinians or Cassians; the other school being that of the Proculeians; all these names being derived from those of certain eminent followers of the two jurists just mentioned. Gaius, the author of the *Institutes*, belonged to the former school, which is said to have been distinguished from the other by a closer adherence to the letter of the law. Probably the best writer on the subject is Dirksen, whose work was published in 1825. The distinction between the character of the doctrines of the two schools is not very strongly marked.

APHORISMUS 97.

Non facilis esto aut proclivis ad judicia rescindenda aditus per Appellationes, aut Impetitiones de Errore, aut Revisus, et similia. Receptum apud nonnullos est, ut lis trahatur ad forum superius, tanquam res integra; judicio inde dato seposito, et plane suspenso. Apud alios vero, ut judicium ipsum maneat in suo vigore, sed executio ejus tantum cesset. Neutrum placet; nisi curiæ in quibus judicium redditum sit fuerint humiles et inferioris ordinis; sed potius, ut et judicium stet, et procedat ejus executio; modo cautio detur a defendente de damnis et expensis, si judicium fuerit rescissum.

Atque hic Titulus, de Certitudine Legum, ad exemplum Digesti reliqui (quod meditamur) sufficiet.

Jam vero Doctrinam Civilem (quatenus eam nobis tractare visum est) conclusimus; atque una cum ea Philosophiam Humanam; sicut etiam, cum Philosophia Humana, Philosophiam in genere. Tandem igitur paululum respirantes, atque ad ea quæ prætervecti sumus oculos retroflectentes, hunc tractatum nostrum non absimilem esse censemus sonis illis et præludiis quæ prætentant musici dum fides ad modulationem concinnant; quæ ipsa quidem auribus ingratum quiddam et asperum exhibent, at in causa sunt ut quæ sequuntur omnia sint suaviora; sic nimirum nos in animum induximus ut in cithara musarum concinnanda et ad harmoniam veram redigenda operam navaremus, quo ab aliis postea pulsentur chordæ meliore digito aut plectro. Sane, cum nobis ante oculos proponamus temporum horum statum, in quibus literæ jam tertio ad mortales videntur rediisse; et una diligenter intueamur quam variis jam nos inviserint instructæ præsidiis et auxiliis; qualia sunt, ingeniorum nostri temporum complurium acumen et sublimitas; eximia illa monumenta scriptorum veterum, quæ veluti tot faces nobis prælucent; ars typographica, libros cujuscunque fortunæ hominibus larga manu suppeditans; oceani sinus laxati, et orbis ex omni parte peragratus, unde experimenta plurima priscis ignota comparuerunt, et ingens accessit Naturali Historiæ cumulus; otium, quo ingenia optima in regnis et provinciis Europæ ubique abundant, cum negotiis minus his in locis implicentur homines quam aut Græci propter populares status, aut propter ditionum amplitudinem Romani solebant; pax qua fruitur hoc tempore Britannia, Hispania, Italia, etiam nunc

Gallia, et aliæ regiones non paucæ; consumptio et exinanitio omnium quæ videntur excogitari aut dici posse circa controversias religionis, quæ tot ingenia jamdiu diverterunt a cæterarum artium studiis; summa et excellens Majestatis tuæ eruditio, cui (tanquam Phœnici volucres) aggregant se undique ingenia; proprietas denique illa inseparabilis quæ Tempus ipsum sequitur, ut veritatem indies parturiat; Hæc (inquam) cum cogitamus, non possumus non in eam spem animum erigere, ut existimemus tertiam hanc Literarum periodum duas illas priores apud Græcos et Romanos longo intervallo superaturam; modo saltem homines et vires suas, atque defectus etiam virium suarum, probe et prudenter nosse velint; atque alii ab aliis, inventionis lampada, non contradictionis torres, accipiant; atque inquisitionem veritatis pro incœpto nobili, non pro delectamento aut ornamento putent; atque opes ac magnificentiam impendant in res solidas et eximias, non in pervulgatas et obvias. Ad labores meos quod attinet, si cui libeat in eorum reprehensione aut sibi aut aliis placere, veterem certe et ultimæ patientiæ petitionem exhibebunt illi; *Verbera, sed audi.*[1] Reprehendant homines quantum libuerit, modo attendant et perpendant quæ dicuntur. Appellatio sane legitima fuerit (licet res fortasse minus ea indigebit), si a primis cogitationibus hominum ad secundas provocetur, et ab ævo præsenti ad posteros. Veniamus nunc ad eam Scientiam qua caruerunt duæ illæ priscæ temporum periodi (neque enim tanta illis fœlicitas concessa est), Sacram dico et divinitus Inspiratam Theologiam; cunctorum laborum ac peregrinationum humanarum sabbatum ac portum nobilissimum.

[1] See Plut. in Themist. c. 11.

FRANCISCI BARONIS DE VERULAMIO,

VICE-COMITIS SANCTI ALBANI,

DE DIGNITATE ET AUGMENTIS SCIENTIARUM

LIBER NONUS.

AD REGEM SUUM.

CAPUT I.

Partitiones Theologiæ Inspiratæ *omittuntur; Tantum aditus fit ad* Desiderata *tria; Doctrinam de* Legitimo Usu Rationis Humanæ in Divinis; *Doctrinam de* Gradibus Unitatis in Civitate Dei; *et* Emanationes Scripturarum.

JAM vero (Rex optime) cum carina parva, qualis nostra esse potuit, universum ambitum tam veteris quam novi orbis scientiarum circumnavigaverit (quam secundis ventis et cursu, posterorum sit judicium), quid superest, nisi ut vota, tandem perfuncti, persolvamus? At restat adhuc Theologia Sacra, sive Inspirata. Veruntamen si eam tractare pergamus, exeundum nobis foret e Navicula Rationis Humanæ, et transeundum in Ecclesiæ Navem; quæ sola Acu Nautica Divina pollet ad cursum recte dirigendum. Neque enim sufficient amplius Stellæ Philosophiæ, quæ hactenus præcipue nobis affulserunt. Itaque par foret, silentium quoque in hac re colere. Quamobrem *partitiones legitimas* circa eam omittemus; pauca tamen, pro tenuitate nostra, etiam in hanc conferemus, loco votorum. Id eo magis facimus, quia in corpore Theologiæ nullam prorsus regionem aut tractum plane desertum aut incultum invenimus; tanta fuit hominum diligentia in seminandis aut tritico, aut zizaniis.

Tres igitur proponemus Theologiæ Appendices, quæ non de materia per Theologiam informata aut informanda, sed tantummodo de Modo Informationis, tractent. Neque tamen, circa eos tractatus (ut in reliquis consuevimus) vel Exempla subjungemus, vel Præcepta dabimus. Id theologis relinquemus. Sunt enim illa (ut diximus) instar votorum tantum.

1. Prærogativa Dei totum hominem complectitur; nec minus ad Rationem quam ad Voluntatem Humanam extenditur; ut homo scilicet in universum se abneget, et accedat Deo. Quare, sicut Legi Divinæ obedire tenemur, licet reluctetur Voluntas; ita et Verbo Dei fidem habere, licet reluctetur Ratio. Etenim, si ea duntaxat credamus quæ sunt rationi nostræ consentanea, rebus assentimur, non authori; quod etiam suspectæ fidei testibus præstare solemus. At fides illa, quæ *Abrahamo imputabatur ad justitiam*, de hujusmodi re extitit quam irrisui habebat Sarah; quæ in hac parte imago quædam erat Rationis Naturalis. Quanto igitur mysterium aliquod divinum fuerit magis absonum et incredibile, tanto plus in credendo exhibetur honoris Deo, et fit victoria Fidei nobilior. Etiam et peccatores, quo magis conscientia sua gravantur, et nihilominus fidem de salute sua in Dei misericordia collocant, eo Deum majore afficiunt honore; omnis autem desperatio Deo pro contumelia est. Quinetiam, si attente rem perpendamus, dignius quiddam est credere quam scire, qualiter nunc scimus. In scientia enim mens humana patitur a sensu, qui a rebus materiatis resilit; in fide autem anima patitur ab anima; quæ est agens dignius. Aliter se res habet in Statu Gloriæ: tunc siquidem cessabit Fides, atque *cognoscemus sicut et cogniti sumus.*

Concludamus igitur, Theologiam Sacram ex verbo et oraculis Dei, non ex lumine naturæ aut rationis dictamine, hauriri debere. Scriptum est enim, *Cœli enarrant gloriam Dei*[1]; at nusquam scriptum invenitur, *Cœli enarrant voluntatem Dei.* De illa pronunciatur, *Ad Legem et Testimonia, si non fecerint secundum verbum istud*[2], &c. Neque hoc tenet tantum in grandibus illis mysteriis de Deitate, Creatione, Redemptione; verum pertinet etiam ad interpretationem perfectiorem legis moralis; *Diligite inimicos vestros; benefacite his qui oderunt vos*, &c.; *ut sitis filii patris vestri qui in cœlis est, qui pluit super*

[1] Ps. xix. 1. [2] Isaiah, viii. 20.

justos et injustos.[1] Quæ certe verba plausum illum merentur, *Nec vox hominem sonat.*[2] Siquidem vox est quæ lumen naturæ superat. Quinetiam videmus poëtas ethnicos, præsertim cum pathetice loquantur, expostulare non raro cum legibus et doctrinis moralibus (quæ tamen legibus divinis multo sunt indulgentiores et solutiores), ac si naturæ libertati cum malignitate quadam repugnent:

Et quod Natura remittit,
Invida jura negant.[3]

Ita Dendamis Indus ad Alexandri nuntios, *Se inaudisse quidem aliquid de nomine Pythagoræ et aliorum sapientum e Græcia, et credere illos fuisse viros magnos; vitio tamen illo laborasse, quod scilicet nimia in reverentia et veneratione habuissent rem quampiam phantasticam, quam Legem et Morem vocitabant.*[4] Quare nec illud dubitandum, magnam partem legis moralis sublimiorem esse, quam quo lumen naturæ ascendere possit. Veruntamen quod dicitur, habere homines etiam ex lumine et lege naturæ notiones nonnullas Virtutis, Vitii; Justitiæ, Injuriæ; Boni, Mali; id verissimum est. Notandum tamen, *Lumen Naturæ* duplici significatione accipi; primo, quatenus oritur ex sensu, inductione, ratione, argumentis, secundum leges cœli ac terræ; secundo, quatenus animæ humanæ interno affulget instinctu, secundum legem conscientiæ; quæ scintilla quædam est, et tanquam reliquiæ, pristinæ et primitivæ puritatis. In quo posteriore sensu præcipue particeps est anima lucis nonnullæ ad perfectionem intuendam et discernendam legis moralis; quæ tamen lux non prorsus clara sit, sed ejusmodi ut potius vitia quadamtenus redarguat, quam de officiis plene informet. Quare Religio, sive mysteria spectes sive mores, pendet ex Revelatione Divina.

Attamen usus Rationis Humanæ in spiritualibus multiplex sane existit, ac late admodum patet. Neque enim sine causa est, quod Apostolus Religionem appellaverit *Rationalem Cultum*

[1] St. Matth. v. 44. and 45.
[2] Virg. Æn. i. 328.
[3] Ovid. Metam. x. 330.
[4] The name of the person of whom this story is told by Plutarch is Dandamis, but wherever Bacon has mentioned it, he spells it as in the text. Dandamis is also mentioned by Arrian, who, however, does not relate this anecdote. We find the same story in Strabo; but the name of the Indian is with him not Dandamis, but Mandanis. See *Plut. in Alex.* c. 65., and Strabo, l. xv. In the *Temporis Partus Masculus*, Bacon speaks of these remarks of Dandamis as one of the exceptions to his general assertion of the worthlessness of the speculations of the philosophers of antiquity.

Dei.[1] Recordetur quis cæremonias et typos veteris legis; fuerunt illæ rationales et significativæ, longe discrepantes a cæremoniis idolatriæ et magiæ; quæ tanquam surdæ et mutæ erant, nihil docentes plerunque, imo ne innuentes quidem. Præcipue Christiana Fides, ut in omnibus, sic in hoc ipso eminet; quod auream servet mediocritatem circa usum Rationis et Disputationis (quæ Rationis proles est) inter leges Ethnicorum et Mahometi, quæ extrema sectantur. Religio siquidem Ethnicorum fidei aut confessionis constantis nihil habebat; contra, in religione Mahometi, omnis disputatio interdicta est; ita ut altera erroris vagi et multiplicis, altera vafræ cujusdam et cautæ imposturæ, faciem præ se ferat; cum sancta Fides Christiana Rationis usum et Disputationem (sed secundum debitos fines) et recipiat et rejiciat.

Humanæ Rationis usus, in rebus ad Religionem spectantibus, duplex est; alter in *explicatione mysterii*, alter in *illationibus* quæ inde deducuntur. Quod ad mysteriorum explicationem attinet, videmus non dedignari Deum ad infirmitatem captus nostri se demittere, mysteria sua ita explicando ut a nobis optime ea possint percipi; atque revelationes suas in rationis nostræ syllepses et notiones veluti inoculando; atque inspirationes ad intellectum nostrum aperiendum sic accommodando, quemadmodum figura clavis aptatur figuræ seræ. Qua tamen in parte, nobis ipsis deese minime debemus; cum enim Deus ipse opera rationis nostræ in illuminationibus suis utatur, etiam nos eandem in omnes partes versare debemus, quo magis capaces simus ad mysteria recipienda et imbibenda: modo animus ad amplitudinem mysteriorum pro modulo suo dilatetur, non mysteria ad angustias animi constringantur.

Quantum vero ad Illationes, nosse debemus, relinqui nobis usum rationis et ratiocinationis (quoad mysteria) secundarium quendam et respectivum, non primitivum et absolutum. Postquam enim Articuli et Principia Religionis jam in sedibus suis fuerint locata, ita ut a rationis examine penitus eximantur, tum demum conceditur ab illis Illationes derivare ac deducere, secundum analogiam ipsorum. In rebus quidem naturalibus hoc non tenet. Nam et ipsa principia examini subjiciuntur; per Inductionem (inquam) licet minime per Syllogismum; atque eadem illa nullam habent cum ratione repugnantiam, ut ab

[1] Romans, xii. 1.

eodem fonte tum primæ propositiones tum mediæ deducantur. Aliter fit in Religione; ubi et primæ propositiones authypostatæ sunt, atque per se subsistentes; et rursus non reguntur ab illa Ratione quæ propositiones consequentes deducit. Neque tamen hoc fit in Religione sola, sed etiam in aliis scientiis, tam gravioribus quam levioribus; ubi scilicet propositiones primariæ Placita sint, non Posita; siquidem et in illis rationis usus absolutus esse non potest. Videmus enim in ludis, puta schaccorum, aut similibus, primas ludi normas et leges mere positivas esse et ad placitum; quas recipi, non in disputationem vocari, prorsus oporteat; ut vero vincas, et perite lusum instituas, id artificiosum est et rationale. Eodem modo fit et in legibus humanis; in quibus haud paucæ sunt *Maximæ* (ut loquuntur), hoc est, Placita mera Juris, quæ authoritate magis quam ratione nituntur, neque in disceptationem veniunt. Quid vero sit justissimum, non absolute, sed relative (hoc est, ex analogia illarum Maximarum), id demum rationale est, et latum disputationi campum præbet. Talis igitur est Secundaria illa Ratio, quæ in Theologia Sacra locum habet; quæ scilicet fundata est super Placita Dei.

Sicut vero Rationis Humanæ in Divinis usus est duplex, ita et in eodem usu duplex excessus; alter, cum in Modum Mysterii curiosius quam par est inquiritur; alter cum Illationibus æqua tribuitur authoritas ac Principiis ipsis. Nam et Nicodemi discipulus videri possit, qui pertinacius quærat, *Quomodo posset homo nasci cum sit senex?*[1] Et discipulus Pauli neutiquam censeri possit, qui non quandoque in doctrinis suis inserat, *Ego, non Dominus;* aut illud, *Secundum consilium meum.*[2] Siquidem Illationibus plerisque stilus iste conveniet. Itaque nobis res salubris videtur et inprimis utilis, si tractatus instituatur sobrius et diligens, qui de Usu Rationis Humanæ in Theologicis utiliter præcipiat, tanquam Divina quædam Dialectica; utpote quæ futura sit instar *opiatæ* cujusdam *medicinæ*, quæ non modo speculationum quibus schola interdum laborat inania consopiat, verum etiam controversiarum furores quæ in Ecclesia tumultus cient nonnihil mitiget. Ejusmodi tractatum inter Desiderata ponimus; et *Sophronem*, sive de *Legitimo usu Rationis Humanæ in Divinis*, nominamus.

2. Interest admodum pacis Ecclesiæ, ut fœdus Christianorum

[1] St. John, iii. 4.

[2] See 1 Corinth. vii.

a Servatore præscriptum, in duobus illis capitibus quæ nonnihil videntur discrepantia, bene et clare explicetur; quorum alterum sic diffinit; *Qui non est nobiscum, est contra nos;* alterum autem sic; *Qui contra nos non est, nobiscum est.*[1] Ex his liquido patet esse nonnullos articulos, in quibus qui dissentit extra Fœdus statuendus sit; alios vero, in quibus dissentire liceat, salvo Fœdere. Vincula enim communionis Christianæ ponuntur, *Una Fides, Unum Baptisma,* &c.[2]; non *Unus Ritus, Una Opinio.* Videmus quoque tunicam Salvatoris inconsutilem extitisse; vestem autem Ecclesiæ versicolorem. Paleæ in arista separandæ sunt a frumento; at zizania in agro non protinus evellenda. Moses, cum certantem reperisset Ægyptium cum Israëlita, non dixit, *Cur certatis?* sed gladio evaginato Ægyptium interfecit. At cum Israëlitas duos certantes vidisset, quamvis fieri non potuit ut utrique causa justa contingeret, ita tamen eos alloquitur, *Fratres estis, cur certatis?*[3] His itaque perpensis, magni videatur res et momenti et usus esse, ut diffiniatur qualia sint illa et quantæ latitudinis, quæ ab Ecclesiæ corpore homines penitus divellant, et a communione fidelium eliminent. Quod si quis putet hoc jampridem factum esse, videat ille etiam atque etiam quam sincere et moderate. Illud interim verisimile est, eum qui *pacis* mentionem fecerit reportaturum responsum illud Jehu ad nuntium (*Nunquid pax est, Jehu?*) *Quid tibi et paci? Transi, et sequere me*[4]; cum non *pax,* sed *partes,* plerisque cordi sint. Nobis nihilominus visum est tractatum de *Gradibus Unitatis in Civitate Dei,* ut salubrem et utilem, inter Desiderata reponere.

3. Cum Scripturarum Sacrarum circa Theologiam informandam tantæ sint partes, de earum Interpretatione inprimis viden-

[1] The two passages Bacon refers to are St. Luke, xi. 23. (or St. Matth. xii. 30.), and St. Luke, ix. 50. But the former he has not quoted accurately. The words of our version are, "He that is not with me is against me;" while the passage in the ninth chapter is, "He that is not against us is for us."

[2] Ephes. iv. 5.

"Sit ergo una fides universæ quæ ubique dilatatur ecclesiæ, tanquam intus in membris, etiamsi ipsa fidei unitas quibusdam diversis observationibus celebratur, quibus nullo modo quod in fide verum est impeditur: omnis enim pulchritudo filiæ regis intrinsecus, illæ autem observationes quæ varie celebrantur in ejus veste intelliguntur. Unde illi dicitur 'In fimbriis aureis circumamicta varietate.'"—*St. August. Ep. ad Casulan. de jejuniis priscorum.* He has elsewhere said, "Desuper texta tunica, quid significat nisi unitatem?" See his *Exp. in Evan. Joan.* in c. 3. and other passages. Compare St. Jerome, *Pro Libris adversus Jovin. Apolog.*, where the many-coloured coat of Joseph is expressly mentioned, as well as the passage in the Psalms to which St. Augustin refers.

[3] See the second chapter of Exodus.

[4] 2 Kings, ix. 19.

dum. Neque nunc de *authoritate eas interpretandi* loquimur, quæ in consensu Ecclesiæ firmatur; sed de *modo interpretandi.* Is duplex est; Methodicus, et Solutus. Etenim latices isti divini, qui aquis illis ex puteis Jacobi in infinitum præstant, similibus fere hauriuntur et exhibentur modis quibus aquæ naturales ex puteis solent. Hæ siquidem aut sub primum haustum in cisternas recipiuntur, unde per tubos complures ad usum commode diduci possunt; aut statim in vasa infunduntur, subinde prout opus est utendæ. Atque modus ille prior Methodicus Theologiam nobis tandem peperit Scholasticam; per quam Doctrina Theologica in Artem, tanquam in cisternam, collecta est, atque inde Axiomatum et Positionum rivuli in omnes partes sunt distributi. At in interpretandi modo Soluto duo interveniunt excessus: alter ejusmodi præsupponit in Scripturis perfectionem, ut etiam omnis philosophia ex earum fontibus peti debeat; ac si philosophia alia quævis, res profana esset et ethnica. Hæc intemperies in schola Paracelsi præcipue, necnon apud alios invaluit: initia autem ejus a Rabbinis et Cabalistis defluxerunt.[1] Verum istiusmodi homines non id assequuntur quod volunt; neque enim honorem, ut putant, Scripturis deferunt; sed easdem potius deprimunt et polluunt. Cœlum enim materiatum et terram qui in Verbo Dei quæsiverit (de quo dictum est; *Cœlum et Terra pertransibunt, Verbum autem meum non pertransibit*[2]), is sane transitoria inter æterna temere persequitur. Quemadmodum enim Theologiam in Philosophia quærere, perinde est ac si vivos quæras inter mortuos; ita e contra Philosophiam in Theologia quærere, non aliud est quam mortuos quærere inter vivos. Alter autem interpretandi modus (quem pro excessu statuimus) videtur primo intuitu sobrius et castus; sed tamen et Scripturas ipsas dedecorat, et plurimo Ecclesiam afficit detrimento. Is est (ut verbo dicamus) quando Scripturæ divinitus inspiratæ eodem quo Scripta Humana explicantur modo. Meminisse autem oportet, Deo Scripturarum Authori duo illa patere quæ humana ingenia fugiunt; Secreta nimirum Cordis, et Successiones Temporis. Quamobrem, cum Scripturarum dictamina talia sint ut ad cor scribantur, et omnium sæculorum vicissitudines complectantur; cum æterna et certa præscientia omnium hæresium, contradictionum, et status Ecclesiæ varii et mutabilis, tum in communi

[1] In support of this statement, see Tennemann's History of Philosophy.
[2] St. Mark, xiii. 31.

tum in electis singulis, interpretandæ non sunt solummodo secundum latitudinem et obvium sensum loci; aut respiciendo ad occasionem ex qua verba erant prolata; aut præcise ex contextu verborum præcedentium et sequentium; aut contemplando scopum dicti principalem; sed sic ut intelligamus complecti eas, non solum totaliter aut collective, sed distributive, etiam in clausulis et vocabulis singulis, innumeros doctrinæ rivulos et venas, ad Ecclesiæ singulas partes et animas fidelium irrigandas. Egregie enim observatum est, quod responsa Salvatoris nostri ad quæstiones non paucas ex iis quæ proponebantur non videntur ad rem, sed quasi impertinentia; cujus rei causa duplex est; altera, quod cum cogitationes eorum qui interrogabant non ex verbis, ut nos homines solemus, sed immediate et ex sese cognovisset, ad cogitationes eorum non ad verba respondit; altera quod non ad eos solum locutus est qui tunc aderant, sed ad nos etiam qui vivimus, et ad omnis ævi ac loci homines quibus Evangelium fuerit prædicandum. Quod etiam in aliis Scripturæ locis obtinet.

His itaque prælibatis, veniamus ad tractatum eum quem *desiderari* statuimus. Inveniuntur profecto inter scripta theologica libri Controversiarum nimio plures; Theologiæ ejus, quam diximus Positivam, massa ingens; Loci Communes; Tractatus Speciales; Casus Conscientiæ; Conciones et Homiliæ; denique prolixi plurimi in libros Scripturarum Commentarii. Quod desideramus autem est hujusmodi: *Collectio scilicet succincta, sana, et cum judicio, Annotationum et Observationum super textus Scripturæ particulares;* neutiquam in locos communes excurrendo, aut controversias persequendo, aut in artis methodum eas redigendo; sed quæ plane sparsæ sint et nativæ. Res certe in concionibus doctioribus se quandoque ostendens, quæ ut plurimum non perennant; sed quæ in libros adhuc non coäluit, qui ad posteros transeant. Certe quemadmodum vina quæ sub primam calcationem molliter defluunt, sunt suaviora quam quæ a torculari exprimuntur; quoniam hæc ex acino et cute uvæ aliquid sapiant; similiter salubres admodum ac suaves sunt doctrinæ, quæ ex Scripturis leniter expressis emanant, nec ad controversias aut locos communes trahuntur. Hujusmodi tractatum *Emanationes Scripturarum* nominabimus.

Jam itaque mihi videor confecisse globum exiguum Orbis Intellectualis, quam potui fidelissime; una cum designatione et

descriptione earum partium, quas industria et laboribus hominum aut non constanter occupatas, aut non satis excultas, invenio. Quo in opere, sicubi a sententia veterum recesserim, intelligatur hoc factum esse animo *proficiendi in melius*, non *innovandi aut migrandi in aliud.* Neque enim mihimetipsi, aut argumento quod in manibus habeo, constare potui, nisi plane decretum mihi fuisset aliorum inventis quantum in me fuerit addere; cum tamen non minus optaverim etiam inventa mea ab aliis in posterum superari. Quam autem in hac re æquus fuerim, vel ex hoc apparet; quod opiniones meas proposuerim ubique nudas et inermes, neque alienæ libertati per confutationes pugnaces præjudicare contenderim. Nam in iis quæ recte a me posita sunt, subest spes id futurum, ut si in prima lectione emergat scrupulus aut objectio, at in lectione iterata responsum se ultro sit exhibiturum; in iis vero in quibus mihi errare contigit, certus sum nullam a me illatam esse vim veritati per argumenta contentiosa; quorum ea fere est ura, ut erroribus authoritatem concilient, recte inventis derogent. Siquidem ex dubitatione error honorem acquirit; veritas patitur repulsam. Interim in mentem mihi venit responsum illud Themistoclis, qui cum ex oppido parvo legatus quidam magna nonnulla perorasset, hominem perstrinxit; *Amice, verba tua civitatem desiderant.*[1] Certe objici mihi rectissime posse existimo, quod verba mea *sæculum* desiderent; sæculum forte integrum ad probandum; complura autem sæcula ad perficiendum. Attamen, quoniam etiam res quæque maximæ initiis suis debentur, mihi satis fuerit sevisse Posteris et Deo Immortali; cujus numen supplex precor, per Filium suum et Servatorem nostrum, ut has et hisce similes Intellectus Humani Victimas, Religione tanquam sale respersas, et Gloriæ suæ immolatas, propitius accipere dignetur.

[1] Not Themistocles, but Lysander. See Plutarch, *Lac. Apophthegmata.*

FINIS.

NOVUS ORBIS SCIENTIARUM,

SIVE

DESIDERATA.

Lib. II.

Errores Naturæ, *sive Historia Præter-Generationum.*
Vincula Naturæ, *sive Historia Mechanica.*
Historia Inductiva, *sive Historia Naturalis in ordine ad condendam Philosophiam.*
Oculus Polyphemi, *sive Historia Literarum.*
Historia ad Prophetias.
Philosophia secundum Parabolas Antiquas.

Lib. III.

Philosophia Prima, *sive de Axiomatibus Scientiarum Communibus.*
Astronomia *Viva.*
Astrologia *Sana.*
Continuatio Problematum Naturalium.
Placita Antiquorum Philosophorum.
Pars Metaphysicæ de Formis Rerum.
Magia Naturalis, *sive Deductio Formarum ad Opera.*
Inventarium Opum Humanarum.
Catalogus Polychrestorum.

Lib. IV.

Triumphi Hominis, *sive de Summitatibus Naturæ Humanæ.*
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APPENDIX.

[The following Notes on some old treatises on the art of writing in cipher are referred to by Mr. Ellis, at p. 658. note 1.—*J. S.*]

THE earliest writer, I believe, on ciphers, except Trithemius whom he quotes, is John Baptist Porta, whose work *De occultis literarum notis* was reprinted in Strasburg in 1606. The first edition was published when Porta was a young man. The species of ciphers which Bacon mentions are described in this work. What he calls the *ciphra simplex* is doubtless that in which each letter is replaced by another in accordance with a secret alphabet. (Porta, ii. c. 5.) The manner of modifying this by introducing non-significants and by other contrivances is described in the following chapter. The *wheel cipher* is described in chapters 7, 8, 9. It is that in which the ordinary alphabet and a secret one are written respectively on the rim of two concentric disks, so that each letter of the first corresponds in each position of the second (which is movable) to a letter of the secret alphabet. Thus in each position of the movable disk we have a distinct cipher, and in using the instrument this disk is made to turn through a given angle after each letter has been written. The *ciphra clavis* is described by Porta, book ii. 15, 16. It is a cipher of position; that is, one in which the difficulty is obtained not by replacing the ordinary alphabet by a new one, but by deranging the order in which the letters of a sentence or paragraph succeed each other. This is done according to a certain form of words or series of numbers which constitute the key. The *cipher of words* was given by Trithemius and in another form by Porta, ii. 19. (and in a different shape, v. 16.). It is a cipher which is meant to escape suspicion. Each letter of the alphabet corresponds to a variety of words arranged in columns. Any word of the first column followed by any of the second, and that followed by any of the third, &c., will make, with the help of a non-significant word occasionally introduced, a perfectly complete sense; and by the time the last alphabet has been used, a letter on some indifferent subject has been written. Only sixty

alphabets are given by Porta, and therefore the secret communication can consist only of sixty letters. It is worth remarking that when Porta wrote it was usual to put the sign of the cross at the head of an ordinary epistle. The first of his alphabets corresponds not to a series of words but to two and twenty different modifications of the figure of a cross, and his second alphabet similarly corresponds to two and twenty different modifications of the introductory flourish. His sixtieth alphabet is of the same kind. We see here perhaps whence Bacon derived his idea of giving significance to seemingly accidental modifications of the characters of ordinary writing.

The idea of a *biliteral alphabet*, which Bacon seems to claim as his own, is employed, though in a different manner, by Porta. His method is in effect this. He reduces the alphabet to sixteen letters, and then takes the eight different arrangements *aaa*, *aba*, &c., to represent them; each arrangement representing two letters indifferently: the ambiguity arising from hence he seems to disregard. In this manner he reduces any given word or sentence to a succession of *a*'s and *b*'s. At this point his method, of which he has given several modifications, departs wholly from Bacon's. Let us suppose the biliteral series to commence with *aababb*. A word of two syllables and beginning with A indicates that two *a*'s commence the series; any monosyllable will serve to show that one *b* follows, another that it is succeeded by one *a*, and then any dissyllable will stand for *bb*. Thus *Amo te mi fili* or *Amat qui non sapit* will represent the biliteral arrangement *aababb*, and so on on a larger scale. Porta's method is therefore not, like Bacon's, a method *scribendi omnia per omnia*, but only *omnia per multa*. Still the analogy of the two methods is to be remarked: both aim at concealing that there is any but the obvious meaning, and both depend essentially on representing all letters by combinations of two only. See the *De oc. Lit. Signis.* v. c. 3.

The *Polygraphia* of Trithemius (dedicated to Maximilian in 1508[1]) consists of six books. The first four contain extensive tables constituting four different *ciphræ verborum*; the first and second of which are significant, and relate, the former to the second person of the Trinity, and the latter to the Blessed Virgin. The fifth and sixth books are of less importance. *Trithemius*, written in the cipher of the second book, becomes "Charitatem pudicissimæ Virginis Mariæ productricis coexistentis verbi, robustissimi commilitonis mei dilectissimi devotissime benedicamus; vivificatrix omnium," &c.

[1] The edition of 1600 is that I use.

Traicté des Chiffres, ou secrètes manières d'escrire, par Blaise de Vigenère, Bourbonnois. (Paris, 1587.)

This work is described by the author as what he had saved of his work "*Du Secrétaire*," written in Italy in 1567 and 68. The two first books were stolen at Turin in 1569. The third is the foundation of the present work. (v. f. 285. verso.) He says he had revealed nothing of its contents.

The two authors whom he chiefly mentions are Trithemius and Porta; that is, modern authors; for there is a great deal said of the Cabala. The key ciphers of which Porta speaks he ascribes to a certain Belasio, who employed it as early as 1549: Porta's book not being published until 1563, "auquel il a inseré ce chiffre sans faire mention dont il le tenoit." Porta's book, he goes on to say, was not *en vente* until 1568. The invention was ascribed to Belasio by the grand vicar of St. Peter at Rome, who had great skill in deciphering. (f. 35. rect. and 37. verso.)

At f. 199. Vigenère gives an account of ciphers in which letters are represented by combinations of other letters,—which Porta had already done, but which he varies in a number of ways.

f. 200. A table where the twenty-three letters of the alphabet, and four other characters are represented by combinations of *abc*. D (e. gr.)=*aaa*, S=*bac*, &c.)

f. 201. A smaller table where an alphabet of twenty-one letters is similarly represented.

f. 202. An alphabet of twenty letters represented by binary combinations of five letters, *a*=ED, &c.

f. 202. goes on to what Bacon speaks of, a cipher within a cipher. You write in a common cipher with an alphabet of eighteen letters; the cipher being such that the five vowels are used as nulls; then by the last cipher these five vowels are made significant, and give the hidden sense. He seems to speak of this as his own.

After mentioning a cipher described by Cardan, he goes on, f. 205. to Porta's ciphers by transposition, &c.

At f. 240. he shows how characters may be multiplied by different ways of writing them; which Porta had not done.

f. 241. An alphabet and &, each character written in four ways.

f. 241. verso, An application of these variations.

f. 242. He remarks that a great variety of uses may be made of this idea, and gives some.

f. 244. He goes on "De ce même retranchement et de la variété de figure, part une autre invention encore d'un chiffre carré à double entente, le plus exquis de tous ceux qui ayent esté decouvers jusqu'à

icy," &c. You write with twelve letters only, as in the subjoined table, in which however I have not followed his ways of diversifying.

	P	*C*	*T*	*E*	*I*	*L*	*M*	*N*	*A*	*R*	*S*	*V*
E *P*	a_1	a_2	a_3	b_1	b_2	b_3	c_1	c_2	c_3	d_1	d_2	d_3
V *C*	e_1	e_2	e_3	f_1	f_2	f_3	g_1	g_2	g_3	h_1	h_2	h_3
T *L*	i_1	i_2	i_3	k_1	k_2	k_3	l_1	l_2	l_3	m_1	m_2	m_3
I *M*	n_1	n_2	n_3	o_1	o_2	o_3	p_1	p_2	p_3	q_1	q_2	q_3
A *N*	r_1	r_2	r_3	s_1	s_2	s_3	t_1	t_2	t_3	u_1	u_2	u_3
R *S*	x_1	x_2	x_3	y_1	y_2	y_3	z_1	z_2	z_3	$\&_1$	$\&_2$	$\&_3$

In this table, z_1, for instance, represents 1st M, and 2nd R or S; to distinguish whether R or S, he has recourse to a supplementary contrivance by nulls.

f. 242. v. He refers to table at 200., and says the three letters *a b c*, (which there represent I) may be replaced by a single character; for this table represents in another column letters by dots. Thus T is . . . . .; D · · ·; or if we will we may put *o*'s for dots; so that D=*o o o* and T=*oo ooo o*; and the spaces may be filled up by a slightly varied *o*. Thus D=*ooooo*, T=*oooooooo*, and thus the whole cipher will apparently consist of *o*'s.

The transition from this to Bacon's cipher is so easy that the credit given to him must be reduced.

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